COMMONWEALTH OF PENNSYLVANIA

WAYNE KNORR, INC.	:	BEFORE THE BOARD OF CLAIMS
	:	
VS.	:	
	:	
COMMONWEALTH OF PENNSYLVANIA,	:	
DEPARTMENT OF TRANSPORTATION	:	DOCKET NO. 3680

FINDINGS OF FACT

Background of the Project

1. Wayne Knorr, Inc. ("Knorr"), is a corporation organized and existing under the laws of the Commonwealth of Pennsylvania, with offices located at 7925 Old Berwick Road, Bloomsburg, Pennsylvania. (Stipulation #1; Notes of Transcript ("N.T.") 48).

2. During the time period relevant to this litigation, Mr. James Knorr, the son of Mr. Wayne Knorr, was the President of Wayne Knorr, Inc. (N.T. 51, 719).

3. The Department of Transportation ("PennDOT") is an agency of the Commonwealth of Pennsylvania, with offices located at the Commonwealth Keystone Building, 400 North Street, in Harrisburg, Pennsylvania. (Stipulation #2; N.T. 48).

4. On August 3, 1999, PennDOT and Knorr executed Contract No. 101131 ("Contract"), for the rehabilitation and expansion of a section of State Road 28 ("SR28") of approximately two-miles in length, located in Armstrong County, Mahoning Township, between the boroughs of Distant and South Bethlehem. As stated in the Contract:

> This project is for the construction of a Truck Climbing Lane using Sub-base (2A & OGS) and Superpave Asphalt Mixture Design, Base, Binder and Wearing, SRL-E, construction of a reinforced concrete box culvert having a length of 56.5 feet; resurfacing with Bituminous Binder Course, ID-2 and Bituminous Wearing Course, ID-2, SRL-E, installation of a temporary traffic signal; guide rail and drainage improvements within a length of 10,733.10 linear (2.033 mile), as indicated on the drawings approved April 9, 1999.

(Plaintiff's Exhibit 1).

5. The SR28 project involved the expansion, renovation and repaving of the roadway between Station 1776+49 and Station 1883+80.[1] (Plaintiff's Exhibits 1, 17, 268A, 277 (p. 12)).

6. The Contract consisted of, inter alia, Contract 101131, containing the signatures of the parties, the schedule of prices and special provisions, the Contract plans and the 1994 Publication 408 Specifications ("408 Specifications"), as amended and supplemented in the Contract. (Stipulation #4; Plaintiff's Exhibit 1; N.T. 49).

7. Knorr was awarded the SR28 Contract for a bid of $3,963,884.40. (Stipulation #6; Plaintiff's Exhibit 1; N.T. 49).

8. Moving generally in a south-to-north direction, the proposed roadway renovation and lane expansion was to start at Station 1776+49, near the borough of Distant, and end in the borough of South Bethlehem at Station 1883+80. At Station 1780, the plans called for new construction of a third lane on the west side of the road to be used as a truck-climbing lane. The proposed three lanes, including transitions, continued for approximately 1.12 miles, whereupon the highway was to transition from three lanes back to two lanes at Station 1839. (Plaintiff's Exhibits 17, 268A, 277 (p. 12)).

9. The area to be widened to create the truck-climbing lane was located primarily on the west side of the project, adjacent to the southbound travel lane, but it also included a portion of the east side of the project between Stations 1780 and 1813. On the side opposite the new truck-climbing lane and elsewhere along the project, the plans called for the renovation of the roadway shoulder. This renovation of the roadway shoulder was to be done, for the most part, by removing (milling) the top of the shoulder material and replacing it with four inches of paving material. However, the plans also called for some "full-depth widening" of the roadway shoulder (i.e., excavating down 19 inches and laying new sub-base and paving materials) in some areas of the project. (Plaintiff's Exhibit 268A; Eberhardt Report at 39-40; N.T. 531-32, 650-51).

10. On the side opposite the new truck-climbing lane between Stations 1820 and 1834, the plans called for renovation of the shoulder by the four inch milling method. On the side opposite the truck-climbing lane between Stations 1834 and 1844 the Contract plans called for a combination of the previously described four inch milling method and some full-depth widening of the shoulder as well. (Eberhardt Report at 43; N.T. 661-62).

11. Just to the north of the new truck-climbing lane, between Stations 1851 and 1852, SR28 crosses a small creek called Bostonia Run. The Contract plans also called for the demolition and replacement of the existing bridge, with construction to be phased in such a way as to allow the simultaneous installation of new bridging while maintaining one travel lane for traffic at all times. The new bridging was to be fabricated from matching "box culvert" sections

[1] "Stations" are a method of marking locations along a roadway project. For the SR28 project, each successive station equals 100 feet in distance. Thus, the distance between Station 1813 and Station 1837, marking the length of the truck-climbing lane that Knorr constructed, is 2400 feet. Increments of less than 100 feet are indicated by adding the number of feet to the station number (e.g., Station 1826+13 to Station 1827+26, or 113 feet).

17'0" wide and 8'3¾" high, and of a length determined to ensure minimum-width travel lanes during construction. (Plaintiff's Exhibits 17, 268A, 271C).

12. The Contract plans stated that roadway renovation work was to be constructed in accordance with PennDOT's project specifications, plans and schedule, all of which were incorporated into and thus form part of the Contract. (Stipulation #4; N.T. 48-49).

13. The bid documents which formed part of the Contract contemplated that a Notice to Proceed would be issued on August 2, 1999. (Plaintiff's Exhibit 277, pp. 20-21).

14. The Contract called for Knorr to complete the roadway construction within 368 calendar days of the date for which PennDOT issued a Notice to Proceed. Because of certain delays at the beginning of the project not attributable to Knorr, PennDOT, on August 9, 2000, issued a Notice to Proceed for August 12, 1999, 10 days later then initially anticipated by the parties.[2] Accordingly, the SR28 project was initially scheduled to finish on August 13, 2000. (N.T. 99; Plaintiff's Exhibits 120, 277 (pp. 20-21)).

The D-476 Distribution of Contract Time

15. PennDOT included in its bid package a form "D-476 Distribution of Contract Time," which is a "straight line diagram of construction sequence and activities." (N.T. 218; Plaintiff's Exhibit 119).

16. Section 108.03 of the 408 Specifications, relating to performance and progress on a construction project, provides in relevant part:

> If the [contractor supplied] schedule is accepted without change in writing by the Chief Engineer, Highway Administration, it will be considered the official schedule for all purposes, including, but not limited to, the calculation of liquidated damages and the computation of time used in proving all claims filed with the Board of Claims. If the [contractor supplied] schedule is not accepted in writing or if no schedule is presented for approval at the preconstruction meeting, the schedule contained in the contract will be the official schedule for all purposes, as stated above.

(408 Specifications § 108.03).

17. On July 30, 1999, a preconstruction meeting was attended by representatives of PennDOT and Knorr. At the meeting, it was noted by someone from PennDOT that a critical-path-method ("CPM") schedule "will be submitted" by Knorr. (Defendant's Exhibit 8).

18. However, by letter dated August 9, 1999, John Fry, PennDOT's Engineering District 10-0 Assistant Engineer for Construction, issued the Notice to Proceed on the project

[2] The dates listed in the Form D-476 schedule (Plaintiff's Exhibit 119) show the original project starting date for construction as August 2, 1999. Because the Notice to Proceed had work actually commencing 10 days later on August 12, 1999, and there is no dispute between the parties on this issue, all further references in this Opinion to dates contained in the D-476 schedule will reflect an addition of 10 days to the dates listed in the D-476 schedule.

and noted that at the July 30, 1999 meeting, Knorr "outlined your method of procedure and agreed that it will be carried on in accordance with our Schedule of Operations on Form D-476 furnished you." (Plaintiff's Exhibit 120).

19. Although Knorr may have indicated at the July 30, 1999 preconstruction meeting that it would submit a CPM schedule of construction activities, both John Fry and Sarah Cunningham (the assistant construction engineer on the project) stated that it was not uncommon on PennDOT construction projects for the contractor to use the D-476 form as the official schedule of construction activities. (N.T. 220-21, 492-95).

20. Mr. Fry also testified that Knorr had the right to use the D-476 schedule as the official schedule for the SR28 project. (N.T. 220).

21. During her testimony, Sarah Cunningham confirmed that, at the preconstruction conference, Knorr stated it would conduct its sequence of construction basically according to the Form D-476 schedule and that she had no problem with that arrangement. (N.T. 446-47).

22. None of the PennDOT officials involved with the SR28 project objected to Knorr using the D-476 schedule as the official project schedule at the time, and no PennDOT official ever requested a CPM schedule in writing. (N.T. 446-48, 1652-53; Board Finding).

23. Knorr never submitted a CPM schedule to PennDOT for approval. (N.T 448, 1652; Board Finding).

24. Section 108.03 of the 408 Specifications and the PennDOT officials managing the SR28 project contemplated that the D-476 schedule would become the official schedule for the project if the contractor did not provide an alternative schedule approved by PennDOT. Because Knorr did not provide an alternative schedule, the D-476 schedule became the official schedule for the SR28 project. (408 Specifications § 108.03; Findings of Fact ("F.O.F.") 15-23; Board Finding).

25. The fact that Knorr did not produce a CPM schedule as an alternative to the construction sequencing found in PennDOT's Form D-476 was not a material factor in the problems experienced on this project. (F.O.F. 15-24; Board Finding).

Knorr's Modification to the D-476 Schedule

26. Knorr's principal scope of work on the project was the addition of a truck-climbing lane beginning just south of Bostonia Run and continuing southward as SR28 traverses uphill towards the borough of Distant. Addition of the truck-climbing lane required Knorr to excavate large amounts of dirt from the slope on the west, uphill side of the SR28 project. (Plaintiff's Exhibits 17, 268A; N.T. 77-79).

27. PennDOT's D-476 schedule (adjusted for 10 day initial delay) provided that excavation work on the project was to start on November 1, 1999 and be completed by April 23, 2000. Drainage work was to commence on December 5, 1999 and finish on May 14, 2000. (Plaintiff's Exhibit 119).

28. PennDOT's D-476 schedule (as adjusted) then shows sub-base and paving work on the SR28 project to commence on April 10, 2000 and conclude on July 29, 2000. (Plaintiff's Exhibit 119).

29. Although PennDOT's D-476 schedule (as adjusted) shows Knorr working throughout the Winter of 1999-2000, the only major construction activity shown during this time is the drainage work scheduled to run from December 5, 1999 to May 14, 2000. (Plaintiff's Exhibit 119).

30. PennDOT's D-476 schedule (as adjusted) also showed that Knorr was to install the box culvert replacement across Bostonia Run between August 24, 1999 and November 7, 1999. (Plaintiff's Exhibit 119).

31. Section 401.3 of the 408 Specifications contains a prohibition against roadway paving which begins on or about October 31 and ends on or about April 1. The D-476 schedule (as adjusted) shows that Knorr's work on the box culvert replacement (which required at least some paving adjacent to the box culvert) would extend beyond PennDOT's general paving prohibition. (408 Specifications § 403.1; Plaintiff's Exhibit 119; N.T. 545, 1021; Board Finding).

32. Knorr had reasonable and significant concerns that the box culvert could not be completed before PennDOT's prohibition against winter paving, not only because of the conflict between the D-476 schedule (as adjusted) and Section 401.3, but also because it was not possible, as a practical matter, to produce and gain PennDOT approval of shop drawings for the pre-cast box culvert sections, and then manufacture these sections, before installation on site was scheduled to commence by the D-476 schedule. (Plaintiff's Exhibit 119; N.T. 140, 144-47, 789; Board Finding).

33. Knorr was also concerned that working through the Winter would greatly decrease efficiency and raise serious issues of safety and practicality. Among other things, Knorr did not believe it could safely run equipment on the hillside during Winter weather, could not perform its paving work, and did not feel it safe to re-direct traffic or place flagmen on the roadway during the Winter. (N.T. 98, 576-77).

34. Because of the concerns summarized above in Findings of Fact 32-33, which the Board finds reasonable and well-founded, Knorr instituted a "Winter Shutdown" of its work on the project from approximately December 15, 1999 to March 15, 2000. This roughly corresponded to PennDOT's seasonal prohibition against winter paving found in Section 401.3 of the 408 Specifications, generally running from October 31 to April 1. (408 Specifications § 401.3(a); F.O.F. 31-33; Board Finding).

35. Shutting down work during the winter months for reasons of safety and practicality is a common practice for roadway contractors in the area of Pennsylvania in which the SR28 project is located. (N.T. 98, 137; Board Finding).

36. In order to compensate for not working over the winter months and address the practical inability to place the box culvert before Winter, yet maintain the overall progress required by the D-476 schedule, Knorr significantly accelerated its bulk excavation and drainage

work in the Summer and Fall of 1999. Knorr commenced excavation work on or about August 23, 1999 and commenced drainage work on or about August 31, 1999. (N.T. 136-38, 778-79).

37. By accelerating its bulk excavation and drainage work during the Summer and Fall of 1999, and largely completing those tasks before temporarily ceasing work on the project on or about December 15, 1999, Knorr had acquired ample time to replace the box culvert and perform its sub-base and paving work in a timely fashion per the D-476 schedule when it re-mobilized at the project on or about March 15, 2000. (Plaintiff's Exhibit 277 (Rhodes Report) at 16, 21-23; N.T. 98; F.O.F. 26-36; Board Finding).

38. Knorr began re-mobilizing for work on or about March 6, 2000. By March 15, 2000, Knorr had completed its preparations necessary to commence most of its sub-base and paving work, which the D-476 schedule anticipated beginning around April 10, 2000. (N.T. 574, 956-59; Plaintiff's Exhibit 119; F.O.F. 26-37).

39. Knorr's Winter Shutdown was not a material factor in the delay to completion of the SR28 project. (Plaintiff Exhibit 277; N.T. 98, 139; F.O.F. 26-38; Board Finding).

40. Knorr is not claiming damages for any events that occurred from August 12, 1999, the date work commenced according to the Notice to Proceed, through March 15, 2000, the approximate date on which Knorr was prepared to begin sub-base and paving work after its Winter Shutdown. (Plaintiff's Exhibit 277 at 16; N.T. 921-22, 947; Board Finding).

41. Although the "as planned" completion date for the Contract (as adjusted) was August 13, 2000, because of several delays and disruptions, the SR28 project did not reach substantial completion until December 7, 2000, a 116-day schedule overrun. (Plaintiff's Exhibit 277 at 3-9; N.T. 921-22, 960, 1037; Board Finding).

42. Despite its readiness to replace the box culvert and commence its sub-base and paving activities so as to maintain the D-476 schedule in mid-March of 2000, Knorr claims it was delayed and disrupted in its work from this point in time until substantial completion (on or about December 7, 2000) because of the following acts and/or omissions alleged to be the responsibility of PennDOT: (1) design conflicts (i.e. numerous missing or incorrect grades/elevations) in PennDOT's plans (i.e. cross sections and profiles); (2) suspension of work in the area of the truck-climbing lane because of slope instability and PennDOT's delay in addressing this problem; (3) PennDOT's withdrawal of approval of Knorr's OGS supplier, followed by PennDOT's failure to timely perform or report plant verification testing; (4) PennDOT's delay in providing redesign specifics for the roadway shoulder between Stations 1820 to 1844; (5) PennDOT's delay in supplying missing roadway grades in the vicinity of the box culvert bridge; and (6) PennDOT's failure to timely schedule the project's semi-final inspection. (Plaintiff's F.O.F. (pp. 17-37); Board Finding).

43. Because of certain extra work performed by Knorr during the SR28 project, PennDOT granted Knorr a 45-work-day Contract extension (61 calendar days) by letter dated August 21, 2000. The revised Contract completion date then became October 13, 2000. (Plaintiff's Exhibit 128; Board Finding).

PennDOT's Legal Arguments Against Knorr's Claims

44. PennDOT alleges that Knorr either negligently lost or deliberately destroyed work diaries for several of its employees who worked on the SR28 project, and that Knorr offered no explanation for the loss of these project records or its failure to produce same during discovery. (Defendant's F.O.F. 180, 184, 185, 194-198).

45. PennDOT further asserts that this failure to produce evidence should invoke the "spoliation of evidence" doctrine and that, at the very least, the Board should draw an adverse inference against Knorr and presume that the evidence, if produced, would harm Knorr's case. (Defendant's Proposed F.O.F. 198; Defendant's Brief at 20-24).

46. Knorr asserts in response that there is no evidence that it lost or destroyed work diaries, that even if diaries are missing there is no evidence that Knorr was at fault, and that, in fact, Knorr produced all relevant documents in its possession. (Plaintiff's Reply Brief at 27-31).

47. James Knorr, president of the company, testified under oath that Knorr gave PennDOT access to all of the existing evidence, some 20 boxes of documents, that Knorr had in its possession relevant to the SR28 project. He also testified that PennDOT representatives made copies of the documents they considered relevant. (N.T. 700, 728).

48. Knorr provided PennDOT with relevant SR28 project diaries from Mr. Knorr, Willie Confer and Ken Day (other Knorr supervisors/foremen on the project). PennDOT also acquired diaries from Mr. Fisher (Knorr's surveyor on the SR28 project). (Plaintiff's Exhibits 21, 23; N.T. 700-703, 731).

49. As to the project field diaries which PennDOT complains are missing, Mr. Knorr testified that the individual employees, not the company, maintained these diaries. Of the employee diaries missing he also testified that:

> (a) Jim Hess, a project foreman for Knorr, changed employment sometime in 2000 and did not hand in field diaries for the SR28 project despite requests from Knorr;
>
> (b) Mr. Knorr asked Joe Ambrose, a project superintendent for Knorr, for his SR 28 project field diaries, but Mr. Ambrose who also left Knorr's employ in 2001 could not find them;
>
> (c) John Barletta, another Knorr employee, worked on the SR28 project for only a few days, retired shortly thereafter and did not provide Knorr with a diary for the project; and
>
> (d) Ron Mroczka, a project superintendent for Knorr, retired from work sometime in 2000 and did not hand in his field diaries.

(N.T. 700-703, 725, 728).

50. As shown in the trial's evidentiary record, PennDOT had access to the field inspection diaries of its own employees who worked on the SR28 project. These diaries amply recorded events on the project (presumably from a PennDOT perspective). (Board Finding).

51. The Board also notes that several of the missing diaries complained of by PennDOT relate to 1999 and 2001. Because most of the issues and problems complained of in this matter occurred in 2000, PennDOT has not persuaded the Board that these missing diaries for 1999 and 2001 are likely to contain a significant amount of information material to the case. In short, PennDOT was not rendered incapable of producing an adequate defense for want of the field diaries from Knorr's employees it claims are missing. (N.T. 698-703, 725-728; F.O.F. 44-50; Board Finding).

52. PennDOT has not provided the Board with evidence sufficient to establish that Knorr deliberately destroyed or negligently lost work diaries or other relevant evidence, or that Knorr failed to provide PennDOT with all of the information PennDOT requested that was in Knorr's possession prior to the trial. (N.T. 728; F.O.F. 44-51; Board Finding).

53. PennDOT also asserts that Knorr failed to call any witnesses who were on the project site on a daily basis and that Mr. Knorr, Plaintiff's primary witness, was frequently absent from the job site. PennDOT therefore reasons that Mr. Knorr was not competent to testify; that the PennDOT witnesses who were present on the job site throughout the project are more credible; and that Knorr's failure to call enough witnesses renders its version of events unsupportable. (Defendant's Proposed F.O.F. 134-173; Defendant's Brief at 24-25).

54. In fact, Knorr called four fact witnesses: James Knorr, John Fry, Sarah Cunningham and Dave Schaffer, the latter three from PennDOT. (Board Finding).

55. Mr. Knorr's testimony was supplemented by the testimony of other fact witnesses and by various documents introduced during the trial. (Board Finding).

56. Although not on the project site everyday, James Knorr, as president of Wayne Knorr, Inc., was on the project site frequently, particularly in 2000, the year when substantially all the problems here at issue occurred. Additionally, Mr. Knorr showed himself at hearing to have significant first-hand knowledge of the project and was found by the Board to be a competent witness when testifying about the issues he addressed during his testimony. The Board addressed directly any specific objections made by PennDOT to Mr. Knorr's testimony during the hearing. (N.T. 51, 719-724; Board Finding).

57. PennDOT also asserts that Andrew Rhodes, from the construction consulting firm of Duggan & Rhodes Group (Knorr's expert on construction delays, inefficiencies and damages) is not a licensed engineer and has generally inferior credentials. PennDOT also asserts that Mr. Rhodes' report and trial testimony were contradictory and that they cannot support any findings of fact in Knorr's favor. (Defendant's F.O.F. 205-246; Defendant's Brief at 37-42).

58. Mr. Rhodes has testified before the Board on several previous occasions and has been accepted as an expert on the issues of construction delays, inefficiencies and damages. His curriculum vitae, education and experience are quite ample to qualify him as an expert in these categories. (Plaintiff's Exhibit 277; N.T. 909-18; Board Finding).

59. Mr. Rhodes was found by the Board to be a competent expert witness to testify on issues respecting the existence and causes of the SR28 project's construction delays and disruptions and on the damages resulting from those delays and disruptions. Additionally, Mr. Rhodes' expert report as well as the reports of PennDOT's experts were admitted into evidence by agreement of the parties. (Plaintiff's Exhibit 277; Defendant's Exhibit 115, 116; N.T. 913, 918; Board Finding).

60. PennDOT also asserts that the Board should ignore Mr. Rhodes' rebuttal testimony because Knorr failed to submit a rebuttal report by December 31, 2006, a pre-trial filing deadline for rebuttal reports set by the Board. (Defendant's Brief at 42-43).

61. Mr. Wilson, attorney for PennDOT, failed to object to any specific aspect of Mr. Rhodes' rebuttal testimony given on the tenth and final day of the hearing. (N.T. 2084; Board Finding).

62. Because Mr. Rhodes' testimony on the tenth and final day of the trial is fairly considered as rebuttal of assertions made during the trial by PennDOT's experts, the Board exercised its discretion to allow this testimony. (N.T. 2092-2151; Board Finding).

63. PennDOT also asserts that Knorr has already been fully compensated for the claims it asserts in this action because Knorr has been paid by force account for the items listed in PennDOT's time extension letter of August 21, 2000, which granted Knorr a 61-day time extension for completion of the project. PennDOT asserts this compensation is provided for by Section 110.03 of the 408 Specifications and precludes Knorr from seeking additional compensation for the delays and disruptions it alleges in this action. (Defendant's Brief at 73-74).

64. The provisions of Section 110.03(a) of the 408 Specifications relating to additional and extra work performed by a contractor state, in relevant part:

> Payment for additional work, extra work, and extra work on a force account basis is accepted as payment in full for all profit and for all equipment, labor, material, field overhead, home office and general administrative expenses, and every other expense incurred as a result of the additional or extra work. No claims for additional compensation of any kind arising out of or relating to such work can be asserted against the Department with the Board of Claims.

(408 Specifications § 110.03(a)).

65. PennDOT's letter of August 21, 2000, granting Knorr a 61 calendar-day time extension for various items of work, lists 11 items of extra work. Eight of these items are not even remotely connected to the issues for which Knorr is presently seeking delay and disruption damages. Of the remaining 3 items: (1) Slope repair #1 from Station 1826+13 to 1827+26 Lt.; (2) Slope repair #2 from Station 1827+50 Lt.; and (3) Bituminous widening at Station 1820+00 to 1834+00, the extra time granted in the August 21, 2000 letter (and any force account payment made thereon) is for the time needed to do the extra work itself. Conversely, Knorr's delay and disruption claims connected to slope repair are not for the time to do the repair but for the delay and disruption caused by PennDOT's indecision and failure to decide upon a repair solution in a

timely manner. Similarly, Knorr's delay and disruption claims for shoulder widening between Stations 1820 and 1834 (and stations 1834 to 1844) are not for the time spent doing the work, but for PennDOT's delay in confirming its change of plans for Stations 1820 to 1834 (and providing necessary grades/elevations for Stations 1834 to 1844) before the shoulder work was undertaken. (Plaintiff's Exhibits 128, 277; Board Finding).

66. The provisions relating to additional work, extra work and extra work paid on a force account basis contained in Section 110.03 of the 408 Specifications do not address Knorr's claims for delay and disruption on this project, because those provisions compensate a contractor for the additional man-hours, equipment, material and other related costs incurred for performing the additional or extra work that has been authorized. (408 Specifications § 110.03; Board Finding).

67. The provisions relating to additional work, extra work and extra work paid on a force account basis contained in Section 110.03 of the 408 Specifications for actually doing the extra work do not compensate Knorr for: (1) waiting for PennDOT to decide how to address the slope failures and instability problem; (2) waiting for PennDOT to decide whether or not to change its plans for widening of the roadway shoulder along Stations 1820 to 1844; or (3) waiting for PennDOT to supply missing or corrective roadway grades/elevations for various locations for roadway construction throughout the project (including the box culvert area). (408 Specifications § 110.03; Board Finding).

68. Section 110.03 of the 408 Specifications is not applicable as a defense against Knorr's claims because the work done (and allegedly paid for by force-account and contract-unit payments made by PennDOT) are not, as a matter of fact, the problems complained of here by Knorr as the cause of its delay and disruption. (Plaintiff's Exhibits 128 and 277; F.O.F. 42, 63-67; Board Finding).

69. Additionally, aside from asserting that the items listed in the letter of August 21, 2000 were paid for by force account or contract unit price (which the letter itself makes no mention of), PennDOT has failed to provide the Board with evidence sufficient to establish what, if anything, PennDOT actually paid to Knorr by force account or unit price for any of the 11 items identified in the letter. (Plaintiff's Exhibit 128; Board Finding).

70. PennDOT also asserts that Contract language and case law precludes the Board from awarding Knorr's separately delineated claim of $101,228 for extended home office overhead calculated pursuant to the Manshul method. (Defendant's Brief at 74-75).

71. The provisions of Section 110.03(d)(7) of the 408 Specifications, relating to overhead and profit made on force-account work performed under the Contract, state:

> Except as specified in Section 110.03(d)4 [service by others], to cover all administration, general superintendence, other overhead, bonds insurance, anticipated profit, and use of small tools and equipment for which no rental is

> allowed, add 40% to the labor cost, add 25% to the material cost, add 5% to the equipment cost, and when applicable, add 8% to the total force account invoice for subcontract work.

(408 Specifications § 110.03(d)(7)).

72. Markups prescribed in contracts for additional or extra work performed by force account (or its equivalent) are frequently used by litigants and experts as appropriate and reasonable markups to costs incurred to calculate delay and disruption damages in construction contract actions. (Plaintiff's Exhibit 277; Board Finding).

73. The Board finds that the markups prescribed in Section 110.03(d)(7) are appropriate and reasonable markups to utilize in calculating the delay and disruption damages incurred by Knorr in this matter. (408 Specifications § 110.03(d)(7); Plaintiff's Exhibit 277; Board Finding).

74. Because the 408 Specification markups already include an allowance for extended home office overhead, a separate award of extended home office overhead pursuant to the Manshul formula, as requested by Knorr, would be duplicative. (408 Specifications § 110.03(d)(7); Board Finding).

75. PennDOT asserts that Knorr's claim is barred by the statute of limitations set forth in Section 1712.1 of the Commonwealth Procurement Code because, according to PennDOT, Knorr knew of its claim on December 29, 2000, but did not submit its claim to PennDOT until July 25, 2003. (Defendant's Brief at 76-80).

76. By letter dated December 29, 2000, Knorr informed PennDOT that Knorr was just beginning to evaluate its additional costs for the SR28 project but anticipated these costs would be in excess of $650,000. (Plaintiff's Exhibit 229).

77. A meeting was held on January 29, 2001, in the office of John Fry (then the Assistant District Engineer for Engineering District 10-0) in order to discuss Knorr's "concerns" expressed in its December 29, 2001 letter and to "begin working toward a common vision of results." (Plaintiff's Exhibits 230, 233; N.T. 229, 231-32).

78. At the January 29, 2001 meeting, John Fry stated that, "We are just meeting today to gather facts. I will get back to you." (Plaintiff's Exhibit 233).

79. By letter dated May 17, 2001, PennDOT informed Knorr of its opinions regarding the several issues apparently discussed during the January 29, 2001 meeting. On nearly all the issues listed by PennDOT, the letter clearly stated that PennDOT would require additional clarification or information. (Defendant's Exhibit D-41).

80. The letter of December 29, 2000; the meeting on January 29, 2001; and the letter of May 17, 2001; each represent part of an ongoing, interim discussion between Knorr and PennDOT regarding the problems and extra costs incurred by Knorr on the SR28 project at that time. These actions, taken while work was still continuing on the project, do not establish that Knorr could then identify an amount due on (or the extent of) its claims or that PennDOT had yet

made a final determination of what, if any, adjustment it might make to the final Contract amount in response to these initial discussions. (Plaintiff's Exhibits 229, 230, 233; Defendant's Exhibit D-41; F.O.F. 75-79; Board Finding).

81. PennDOT issued its Notification of Final Quantities and Contract Settlement Amount for the SR28 project on February 3, 2003. (Plaintiff's Exhibit 239; N.T. 126-28).

82. Until PennDOT issued its Notification of Final Quantities and Contract Settlement Amount, Knorr did not know what, if any, adjustments PennDOT would make to payments due Knorr (i.e., Knorr did not have a definitive refusal of its requests for adjustments) and Knorr could not form a concise or accurate statement of claims against PennDOT. (Plaintiff's Exhibit 239; N.T. 128; F.O.F. 75-81; Board Finding).

83. Section 1712.1 of the Commonwealth Procurement Code, 62 Pa.C.S.A. § 1712.1, states in relevant part:

> **(b) Filing of claim.—**A claim shall be filed with the contracting officer within six months of the date it accrues. If a contractor fails to file a claim or files an untimely claim, the contractor is deemed to have waived its right to assert a claim in any forum. Untimely filed claims shall be disregarded by the contracting officer.
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> **(d) Determination.—**The contracting officer shall review a claim and issue a final determination in writing regarding the claim within 120 days of the receipt of the claim unless extended by consent of the contracting officer and the contractor. If the contracting officer fails to issue a final determination within the 120 days unless extended by consent of the parties, the claim shall be deemed denied. The determination of the contracting officer shall be the final order of the purchasing agency.

84. Knorr submitted a claim on the SR28 project to PennDOT in the form of a Request for Equitable Adjustment to the District Engineer on July 25, 2003, within six months of the February 3, 2003 Notification of Final Quantities and Contract Settlement Amount. (Plaintiff's Complaint ¶ 24; Plaintiff's Exhibit 239; N.T. 126-28; Board Finding).[3]

85. PennDOT failed to issue a determination within the 120 days of Knorr's Request for Equitable Adjustment as set forth in Section 1712.1(d) of the Commonwealth Procurement Code, and Knorr filed its claim with the Board on December 5, 2003, within 135 days of Knorr's submittal to PennDOT of its Request for Equitable Adjustment. (F.O.F. 84; Board Finding).

[3] PennDOT denies this averment as a conclusion of law to which no response is required. However, even if we accept PennDOT's apparent legal argument that the filing of this Request for Equitable Adjustment should not be considered Knorr's operative "claim" from which to calculate the running of the applicable statute of limitations, the averment nonetheless contains a purely factual component as well (i.e. that Knorr filed a claim with PennDOT's District Engineer in the form of a Request for Equitable Adjustment) which PennDOT did not address in its Answer or otherwise. Thus, the fact that Knorr submitted a Request for Equitable Adjustment on July 25, 2003 is an averment of fact unanswered by PennDOT, and is thus deemed admitted. See e.g. First Wisconsin Trust Co. v. Strausser, 653 A.2d 688, 692 (Pa. Super. 1995).

Missing or Incorrect Grades/Elevations in PennDOT's Plans

86. By letter dated December 29, 1999, Jim Hess, Knorr's project foreman at the time, wrote to Assistant Construction Engineer Sarah Cunningham to inform her of certain problems on the SR28 project. Among other things, the letter stated that in the following locations "the profile grade point does not match the cross section plotting:" 1820+50 to 1822+00; 1824+00; 1829+50 to 1832+00; 1838+00 to 1840+00. The letter also stated that "there are no super elevations given on the plans for the following areas:" 1864+50 to 1875+00; 1881+50 to 1882+00. The letter noted that Knorr had "enclosed a copy of the cross sections of the existing pavement on the entire project we took on December 7, 1999." (Plaintiff's Exhibit 132; N.T. 557-559).

87. The purpose of the December 29 letter was to request PennDOT to resolve certain design issues on the SR28 project during the Winter Shutdown months, so that when Knorr returned to work in March 2000 it could begin widening the roadway and paving those areas where the missing or inconsistent elevation information was needed.[4] (N.T. 183-87).

88. There were numerous instances of missing or conflicting elevations on the SR28 project plans and drawings (e.g. cross sections and profiles). The plans and drawings containing these grades and elevations for the project are design (not performance) specifications. (Plaintiff's Exhibit 17, 60, 132, 277 (p. 32); Defendant's Exhibit D-114; N.T. 182-85; Board Finding).

89. On or about March 23, 2000, Knorr received "revised cross-slopes" from PennDOT for the project. (N.T. 1615).

90. On or about April 4, 2000, Knorr received revised roadway "grades and elevations." (Plaintiff's Exhibit 137; N.T. 192-97).

91. Upon receiving the revised grades/elevations on March 23 and April 4, 2000, Knorr could not immediately begin sub-base and paving work. Instead, Knorr needed to recompute roadway profiles and cross-sections as a result of the revised information it received on March 23 and April 4. (N.T. 982-83; Board Finding).

92. When Knorr received the revised elevations on March 23 and April 4, 2000, Dick Fisher (the field surveyor for Knorr) and Brian Heeter (then a PennDOT transportation construction inspector) sat down and plotted the original profile elevations; the existing elevations previously supplied by Knorr's surveyor in December 1999 and the new grades/elevations that had been supplied by April 4, 2000 to produce appropriately revised cross sections for use in actual construction. (N.T. 1615-17).

[4] The Board's review of the testimony and documentary evidence as a whole leads us to conclude that the parties sometimes mix the terms "elevations", "super-elevations", "grades" and "slopes." The Board understands that, while these terms have their own distinct meanings, the parties are fundamentally describing the presence, lack, or inconsistency of elevations in the profiles and/or cross sections of the plans as the basic information needed to build the roadway. Accordingly we will typically refer to the subject information as "elevations" or "grades" in our discussion.

93. Mr. Fisher and Mr. Heeter completed the necessary recomputation of roadway grades/elevations and revised cross sections in a reasonable time and manner, and paving commenced on a more or less regular basis on or about April 13, 2000. (Plaintiff's Exhibit 131 (April 13, 2000); N.T. 1615-1617, 1732; Board Finding).

94. The reasons for the delay in supplying the revised elevations from Knorr's request for same in December 1999 until March 23, 2000 and April 4, 2000 were never explained to Knorr, and the evidence presented at trial by PennDOT does not provide an explanation. (N.T. 201, 967; Board Finding).

95. Knorr was ready to begin a limited amount of sub-base and paving operations on or about March 15, 2000, the date by which Knorr was fully re-mobilized after the Winter Shutdown and by which time it had completed sufficient predecessor activities necessary to begin sub-base and paving activities. (N.T. 574, 957-59).

96. The number and location of the missing and incorrect elevations on PennDOT's initial plans (e.g. cross sections and profiles) was a significant impediment and a material cause of delay and disruption to Knorr's sub-base and paving work. (Plaintiff's Exhibits 17, 60, 132, 277 (p. 32); Defendant's Exhibit D-114; N.T. 960-61, 965-68, 985-88; F.O.F. 86-94; Board Finding).

97. PennDOT delayed and disrupted Knorr's progress in its sub-base and paving operations as PennDOT failed to supply in a timely manner the necessary elevations as described in Findings of Fact 86-96 above. This delay and disruption to Knorr's work occurred from March 15, 2000, the date on which Knorr was substantially re-mobilized on site, until April 4, 2000, the date on which Knorr received a sufficient portion of the revised grades/elevations to commence this work. (Plaintiff's Exhibits 17, 60, 277 (p. 32); Defendant's Exhibit D-114; N.T. 957-59, 961, 965-66, 981-84; F.O.F. 86-96; Board Finding).

98. By failing to supply the necessary roadway grades/elevations in a timely manner as noted in Findings of Fact 86-97 above, PennDOT failed to provide plans (i.e. design specifications) adequate to construct the roadway in a timely manner, failed to take steps necessary to progress the project and actively interfered with Knorr's sub-base and paving operations. (F.O.F. 86-97; Board Finding).

Suspension of Work in the Area of the Truck-Climbing Lane Because of Slope Instability

99. A big part of the work that was to be completed under the Contract was the creation of a third lane for truck-climbing, which lane was to run uphill and southward beginning at Station 1837 and ending at Station 1813 (approximately 2400 feet). In order to create this truck-climbing lane, Knorr had to excavate a substantial portion of the hillside between those two stations adjacent to the southbound travel lane. (Plaintiff's Exhibits 17, 33A, 268A; N.T. 74-78).

100. This truck-climbing lane was also to have along its entire western length an eight-foot wide "drop zone" along the bottom of the slope in order to catch any rock or other material that might slide down the excavated slope. (N.T. 1745).

101. On or about September 17, 1999, Knorr notified PennDOT that a part of the slope created when Knorr excavated the hillside (from approximately Stations 1819 to 1823) might not stand "at a 1½ or 1¼ as detailed on the x-sections." In other words, Knorr reported to PennDOT that the slope, when cut as per PennDOT design specifications, did not appear stable. (Plaintiff's Exhibit 65, 155; Defendant's Exhibit D-115 (p.32); N.T. 618-19).

102. On or about September 21, 1999, Tom Polacek, a PennDOT Engineering District 10-0 geotechnical engineer, visited the project to review the slope problem. Mr. Polacek stated that from Stations 1814 to 1817 +50 the slope should not be cut any steeper than 1½:1, but that in all other areas the cuts could be made as shown on the project cross sections. (N.T. 619-20).

103. On an unknown date sometime after commencement of the Winter Shutdown, two areas of the slope immediately to the west of the truck-climbing lane failed (i.e., soil and rock slid down the slope and was deposited at its base along the roadway). The first area was appropriately 113 feet in length and was located from Station 1826+13 to Station 1827+26. The second slope failure of lesser magnitude was located around Station 1827+50. (Plaintiff's Exhibit 128; N.T. 620-21).

104. Although the areas of the slope that failed were limited in length, a "fault line" that reflected an initial cracking of earth along the slope ran through a substantial portion of the 2400-foot length of the newly cut slope. (Plaintiff's Supplement Exhibit 33; N.T. 621, 1664-65).

105. One of the causes of the cracking of the earth and the previously mentioned slope failure was the amount of water seeping out of the uphill areas of the slope. (N.T. 520-1, 611, 614-15).

106. While awaiting direction from PennDOT on how PennDOT wished to address the failures and apparent slope instability, Knorr ceased work on the 2400-foot stretch along the southbound truck-climbing lane between Stations 1813 to 1837 over concern that further slope failures and future corrective work would ruin any sub-base and paving work laid down to create the new truck-climbing lane before the slope problem was addressed. (N.T. 408-11, 519-20, 526, 617, 1008-1009, 1491-92, 1974-75).

107. On March 22, 2000, Ray Suhadulnik (then a PennDOT Engineering District 10-0 geotechnical engineer) was on site to review the slope failures and the condition of the entire length of the cut slope from Station 1813+50 to Station 1837. Mr. Suhadulnik indicated he would discuss the situation with district personnel and get back to Knorr with a proposed solution. (Plaintiff's Exhibit 159).

108. On March 24, 2000, Tom Polacek was again on site to examine the slope failure. He recommended that Knorr dig the loose material from the slide areas and place geotextile material and rock in the excavated area. For the remaining length of the slope, he recommended that Knorr should wait until an area of the slope failed and then fix it in this same manner. (Plaintiff's Exhibit 160; N.T. 622-23).

109. Mr. Knorr disagreed with Mr. Polacek's proposed solution to the slope failure issue. Instead, Mr. Knorr wanted PennDOT to either lay back parts of the slope to a lesser angle of incline or to re-excavate and place rock along the length of the slope to prevent further sliding of soil and rock down the slope. This was due in no small part because of the fault-line crack which appeared through most of the slope cut. (N.T. 519-20, 621-24; F.O.F. 99-108; Board Finding).

110. On March 28, 2000, a project progress meeting was held and was attended by PennDOT officials and Knorr personnel. At this meeting, Knorr was instructed to repair only the failed areas of the slope substantially as per the method recommended by Tom Polacek, but to eliminate the placement of geotextile material. These instructions came from assistant construction engineer Sarah Cunningham. (Defendant's Exhibit 59).

111. On or about April 11 or 12, 2000, Mr. Suhadulnik was again on site to review the slope failure problem. Knorr was then informed that the slope should be cut back to the cross-section limits, the loose material would be removed, an 18" combination drain and piping would be installed, and then, after the affected areas of the slope had drained, a final solution would be proposed. (Plaintiff's Exhibit 164).

112. The 18-inch combination drain and some 800 feet of piping were installed in order to drain water away from the slope and roadway as quickly as possible. (N.T. 520-21).

113. On May 1, 2000, Mr. Steffy, civil engineer supervisor for PennDOT, directed Mr. Knorr to perform the slope repairs from Station 1826 through 1834 on a "force account" basis, and advised that Knorr should have available the hourly labor and material records for the repair process. (Plaintiff's Exhibit 65, 277 (p. 43) and attachment 22).

114. Between May 3 to 8, 2000, Knorr performed slope repair #1, between Stations 1826+13 and 1827+26. (Plaintiff's Exhibits 65, 128, 277; Defendant's Exhibit D-115 (p.34)).

115. In order to perform slope repair #2, PennDOT first had to obtain permission from the Pennsylvania Game Commission to enter land managed by the Commission. PennDOT received that permission on or about May 24, 2000. (Defendant's Exhibit D-115 (p.34)).

116. PennDOT then made additional revisions to its slope repair protocol for slope repair #2 on June 23, 2000, indicating that "all of repair will be deleted with the exception of the rock ditch extension. The repair will begin on Mon. 6/26." (Plaintiff's Exhibit 173).

117. On June 26, 2000, Knorr performed slope repair #2, from Station 1827+32 to Station 1827+77 as directed by PennDOT. (N.T. 1745; Plaintiff's Exhibits 65, 128, 277; Defendant's Exhibit D-115 (p.34)).

118. On August 28, 2000, PennDOT inspected and approved slope repair #2. (Plaintiff's Exhibit 65, 277 (p.43)).

119. On September 13, 2000, PennDOT inspected and approved slope repair #1. (Plaintiff's Exhibit 65, 277 (p.43)).

120. Knorr initially excavated and constructed the slope here at issue for the project as indicated by the original plans and drawings provided by PennDOT. After slope instability problems occurred, Knorr addressed said slope areas as thereafter modified by direction from PennDOT. These plans and drawings and the subsequent directions modifying same from PennDOT constituted design (not performance) specifications. (F.O.F. 99-119; Board Finding).

121. Sarah Cunningham, PennDOT's assistant construction engineer for the SR28 project, stated that she could understand why a contractor would want to resolve the slope instability problems before commencing adjacent sub-base and paving operations. She further stated that she did not know what would have been the "best construction practice" in a situation such as this one. (N.T. 408-11).

122. Mr. Knorr's concern in the Spring of 2000 that the magnitude of failure along the 2400-foot length of newly cut slope would be much more extensive than the approximate 160 feet that actually failed was reasonable and appropriate under the circumstances as they existed at the time. (N.T. 1974-75; F.O.F. 99-121; Board Finding).

123. Even with the presence of the eight-foot wide drop zone, had Knorr proceeded with its sub-base and paving work along the truck-climbing lane, the distinct possibility existed that Knorr would have had to bring heavy equipment over newly paved portions of the roadway in order to repair areas of the slope that experienced failure. Such repair efforts would have significantly damaged any newly laid sub-base or paving in the truck-climbing lane and required re-work of same. (N.T. 1008-09, 1491-92; F.O.F. 99-122; Board Finding).

124. Knorr's position on this issue, that Knorr wanted the slope problems resolved before continuing the sub-base and paving work for the truck-climbing lane, and his suspension of this work until the repairs were completed, was reasonable under the circumstances as they existed at the time. (N.T. 410-11; F.O.F. 99-123; Board Finding).

125. PennDOT's initial failure to provide plans that did not result in slope instability and its lengthy consideration of the slope-instability issue when it did arise of the project (i.e. PennDOT's failure to timely address the slope instability and slope repair problems) were the primary and material cause of the delay and disruption to Knorr's sub-base and paving operations along the 2400-foot stretch of the truck-climbing lane. As a result of this failure, Knorr's sub-base and paving work could not reasonably begin along this stretch of roadway until on or about June 26, 2000 (i.e. commencement of the last slope repair). (N.T. 526; F.O.F. 99-124; Board Finding).

126. According to the D-476 schedule, by the time sub-base work actually began in the area of the truck-climbing lane from Station 1813 to Station 1837, this work was well behind schedule and only about one month remained to complete all paving on the project. (Plaintiff's Exhibit 119; F.O.F. 99-125; Board Finding).

127. PennDOT's failure to timely address the slope instability and slope repair problems delayed and disrupted Knorr's sub-base and paving activities along the 2400 feet of the truck-climbing lane from on or about March 22, 2000, to June 26, 2000. (Plaintiff's Exhibit 65, 277; N.T. 1015-17; F.O.F. 99-126; Board Finding).

128. By failing to timely address the slope instability and slope repair problems as described in Findings of Fact 99-127 above, PennDOT failed to provide adequate plans and direction regarding design specifications necessary to construct the roadway in a timely manner, failed to take steps necessary to progress the project and actively interfered with Knorr's sub-base and paving operations. (F.O.F. 99-127; Board Finding).

129. Even if Knorr was compensated for the actual labor and material used to perform the slope repairs on a force-account basis, it was not compensated for the time lost waiting for PennDOT to finally address the slope repair and instability problem and to direct Knorr how PennDOT wished it to perform the extra work of actually doing the slope repairs. (N.T. 520, 526, 617; F.O.F. 63-69, 99-128; Board Finding).

PennDOT's Failure to Timely Perform and/or Report OGS Verification Testing

130. In order to construct the truck-climbing lane and other areas of the SR28 project where a new roadway was to be constructed, Knorr had to excavate the ground down to a certain depth, put four inches of 2A stone down, and cover the 2A stone with three to four inches of "open graded sub-base" (OGS). Blacktop (BCBC) was then to be placed over the OGS. Finally, over the top of the blacktop was to be placed a layer of bituminous binder course and 2 inches of a wearing course. (N.T. 60-61).

131. Section 106.02(a) of the 408 Specifications, relating to the preliminary acceptance of materials such as 2A stone and OGS, states in relevant part: "Use such material only after written acceptance has been received from the Department . . . and only so long as the material complies with the requirements." (408 Specifications § 106.02(a)).

132. Section 106.02(b) of the 408 Specifications, relating to inspections of material used on a project, states in relevant part: "Inspections and tests, if made at any point other than the point of incorporation in the work, will not guarantee acceptance of the material." (408 Specifications § 106.02(b)).

133. Section 106.03(a)(1) of the 408 Specifications, relating to the testing and acceptance of materials, states in relevant part: "The Department will be responsible for determining the acceptance of the construction and the material. Unless otherwise specified, the Department will be responsible for all acceptance testing." (408 Specifications § 106.03(a)(1)).

134. PennDOT's Bulletin 14, Publication 34, relating to the aggregate producers of rock and other material, lists the pre-approved suppliers of 2A and OGS material. Bulletin 14 states: "Listing in this Bulletin does not provide assurance that the material from these sources will meet the requirements of the specifications at all times." (Defendant's Exhibit D-32).

135. By letter dated August 24, 1999, PennDOT approved Grange Lime & Stone as Knorr's supplier for 2A stone and OGS. (Plaintiff's Exhibit 196).

136. On March 16, 2000, shortly after Knorr re-mobilized to commence work after the Winter Shutdown, PennDOT informed Knorr that Grange Lime & Stone had experienced an "OGS failure" and that Knorr was not to use OGS from Grange until a PennDOT plant verification test had been completed. (N.T. 517-19).

137. The sample of OGS that experienced a failure was a sample of the rock that was taken directly from the Grange quarry. In a case such as this, the test results would be sent to Grange Lime & Stone and to the Engineering District 10-0 offices. (N.T. 1604-05).

138. The order to cease shipping Grange OGS to the SR28 project and all other state projects was given by the PennDOT materials testing division. (N.T. 1605).

139. On March 20, 2000, Knorr was again informed that it was not to receive OGS from Grange Lime & Stone until PennDOT received results from its plant verification tests. (Plaintiff's Exhibit 198; N.T. 598).

140. Under typical circumstances, plant verification testing of a supplier's stone would take about two weeks. (N.T. 602).

141. Because obtaining OGS from Grange Lime & Stone was less expensive than it would have been from other available suppliers, Knorr decided not to immediately seek another supplier. (N.T. 601-02, 1950-51).

142. As of approximately March 20, 2000, although Knorr had some areas of the project for which it could have laid OGS, those areas were limited in scope and did not include the entire length of the truck-climbing lane, the work on which was being delayed by the slope-instability problem. (N.T. 1951-52).

143. Dave Schaffer, PennDOT transportation construction inspection supervisor, was acting, in effect, as PennDOT's on-site project manager for the SR28 project. (N.T. 1546-47).

144. On May 8, 2000, Dave Schaffer was informed that OGS from Grange Lime & Stone was still not approved for use because the OGS did not meet the PennDOT requirements contained in the 408 Specifications. (Plaintiff's Exhibit 199).

145. Whether or not Dave Schaffer informed Knorr of the continued lack of approval of Grange OGS after being so advised on May 8, 2000 is unclear. However, on May 10, 2000, Knorr decided to obtain OGS from Glacial Sand and Gravel. Knorr received verbal approval for the switch of suppliers from Rich Polenik, a PennDOT Engineering District 10-0 assistant materials engineer at this time. (Defendant's Exhibit D-82).

146. In his work diary entry of May 10, 2000, Mr. Confer, a Knorr project manager, first stated on this date that Knorr was "ready to place OGS." (Defendant's Exhibit D-37).

147. Knorr never received a written confirmation from PennDOT that Grange Lime & Stone either had or had not been approved as a supplier of OGS pursuant PennDOT's plant verification test. (N.T. 598-600).

148. After PennDOT suspended shipment of OGS to the SR28 project site, PennDOT either failed to conduct a subsequent plant verification test for this OGS or failed to timely report the results of this test to Knorr. (F.O.F. 130-147; Board Finding).

149. Although Mr. Knorr testified that Knorr was ready to begin laying OGS generally around the end of April 2000, the Board finds that because of the delays to its work caused by missing/incorrect grades and elevations and delayed resolution of the slope instability problems (noted above), Knorr was not prepared to begin placing material amounts of OGS sub-base on the roadway until early May 2000 as noted in Mr. Confer's diary. When it was ready to place material amounts of OGS, Knorr promptly replaced Grange Lime & Stone with Glacial Sand & Gravel as its OGS supplier. (N.T. 1002-1003, 1952; F.O.F. 130-148; Board Finding).

150. Because the evidence shows that Knorr was not ready to begin placing material amounts of OGS until early May 2000 (for the reasons stated above), Knorr has failed to present sufficient evidence for the Board to find that the seven-week delay in conducting or reporting the results of a subsequent plant verification testing of Grange's OGS was a material cause of any delay or disruption to Knorr's sub-base and paving work. (F.O.F. 130-149; Board Finding).

PennDOT's Changes to the Roadway Shoulder from Stations 1820 to 1844

151. After returning to the project following the Winter Shutdown in March 2000, and resolution of the missing roadway grades/elevations described above in Findings of Fact 86-98, Knorr attempted to begin continuous paving operations on or about April 13, 2000 on those portions of roadway that were relatively unaffected by the problems with the slope instability described in the Findings of Fact 99-129 above. (N.T. 1732; F.O.F. 86-98, 99-129; Board Finding).

152. Between Stations 1820 to 1834, the Contract required Knorr to resurface two-to-four feet of the roadway shoulder by milling the roadway shoulder down and replacing it with approximately four inches of blacktop. (N.T. 531-32, 650-51).

153. However, on April 26, 2000, PennDOT received a report of roadway shoulder and/or temporary pavement cracking along a 77-foot segment at Stations 1783+96 to 1784+73. This area had been milled and overlaid with the four inches of blacktop in the same manner as Knorr was to mill and overlay the shoulder at Stations 1820 to 1834. (Plaintiff's Exhibit 277 (p. 36); Defendant's Exhibit D-115 (p. 39); N.T. 81-82).

154. Because of the failing pavement between Stations 1783+96 and 1784+73, PennDOT decided to change the method for the widening of the roadway shoulder between Stations 1820 to 1834. (Plaintiff's Exhibit 277 (p. 36); Defendant's Exhibit D-115 (p. 39); N.T. 649-51, 668).

155. On May 1, 2000, Knorr was advised that PennDOT would be changing its method for widening of the roadway shoulder between Stations 1820 to 1834. (Plaintiff's Exhibit 277 (pp. 35-38); N.T. 650-54).

156. However, Knorr was not advised of the details of the new specifications for the widening of the roadway shoulder between Stations 1820 and 1834 until they were approved by PennDOT's Assistant Construction Engineer, Sarah Cunningham, on May 9, 2000. The change required Knorr to do "full-depth" widening of the shoulder (i.e. to excavate down some 19 inches and reconstruct the shoulder with standard layers of sub-base and paving material up to grade). (Plaintiff's Exhibit 149, 277; N.T. 650-54, 95-97, 533, 538; Board Finding).

157. Even on May 9, 2000, Knorr did not receive written plans from PennDOT for the changes to the roadway shoulder widening from Stations 1820 to 1834. Instead, Knorr was directed to build it as it had other full depth widening shoulder areas and bill it out by the unit prices already contained in the Contract. (N.T. 537).

158. As a result of this sequence of events, Knorr was delayed and disrupted in its work between Stations 1820 to 1834 during the period from May 1, 2000 (the date on which Knorr was notified that PennDOT would be changing the nature of the original shoulder work) until May 9, 2000 (the date on which PennDOT approved the change and directed Knorr to do a full-depth widening for these sections). (Plaintiff's Exhibit 277 (pp. 35-38, 53); F.O.F. 151-157; Board Finding).

159. Knorr claims that the new specifications by which Knorr was required to widen the roadway shoulder from Station 1820 to Station 1834 (by full-depth widening) required Knorr to cut back into the existing roadway further than the four inch milling specification required. According to Knorr, this meant that there was now only 18 to 19 feet of roadway width between Stations 1820 to 1834, and, as a result of this change, Knorr did not have two ten-foot travel lanes in order to allow unrestricted traffic to travel through Stations 1820 to 1834 during this shoulder reconstruction. Consequently, Knorr had flagmen directing traffic along this stretch of roadway on a 24-hour-a-day basis during this revised shoulder renovation work. (Plaintiff's Exhibit 277; N.T. 550-53).

160. However, the original four inch milling procedure for renovating the roadway shoulder from Stations 1820 to 1834 would also have intruded into the adjacent travel lane during milling (for Knorr's equipment clearance if nothing else) and would also have required flagmen to direct traffic through this area of the project for the duration of the shoulder reconstruction (or backfill every evening) even under the original widening procedure. Moreover, this entire revised widening procedure was accomplished in approximately 44 hours (morning of 5/23/00 to 5/25/00 at 4 am). (Plaintiff's Exhibit 277; Defendant's Exhibit 115 (pp. 39-42 with attachments); N.T. 531-33, 654-56; F.O.F. 151-159; Board Finding).

161. PennDOT's change to the roadway shoulder reconstruction from Stations 1820 to 1834, in and of itself, did not materially increase Knorr's costs for flagmen or the maintenance and protection of traffic (i.e. MPT costs). (Plaintiff's Exhibit 277 (p. 35-38); Defendant's Exhibit D-115 (p. 39-42 with attachments); F.O.F. 151-160; Board Finding).

162. Between Stations 1834 to 1844 of the roadway, the original Contract plans required Knorr to do some full-depth widening of the roadway shoulder and to widen same by approximately two to three feet. (Plaintiff's Exhibit 17; Defendant's Exhibit D-114; N.T. 661-62).

163. However, for Stations 1834 to 1844, PennDOT also changed the original plan by expanding the already planned full-depth shoulder widening by an additional five to six feet in width. (Plaintiff's Exhibit 17; Defendant's Exhibit D-114; N.T. 661-62).

164. PennDOT's decision to expand the width of the roadway shoulder widening from Stations 1834 to 1844 required PennDOT to furnish new grades/elevations for same before Knorr could be expected to proceed with this work. (Plaintiff's Exhibit 17; Defendant's Exhibit D-114; N.T. 100, 665, 1024-29; Board Finding).

165. However, Knorr did not receive a final plan for the widening of the roadway shoulder between Stations 1834 and 1844, including needed shoulder elevations until July 19, 2000. (Plaintiff's Exhibit 104, 277 (pp. 35-38); N.T. 100, 665).

166. Thus, Knorr was delayed and disrupted in this roadway shoulder work between Stations 1834 to 1844 during the period from May 1, 2000 (the date Knorr was informed of changes to this roadway shoulder widening) to July 19, 2000 (the date on which Knorr received the necessary grades/elevations for widening the roadway shoulder between Stations 1834 to 1844). (Plaintiff's Exhibit 277 (pp. 35-38, 53); F.O.F. 151-165; Board Finding).

167. The changes from the four inch milling specification to the full depth widening specification for the roadway shoulder between Stations 1820 to 1834 and the changes to the width of roadway shoulder renovation between Stations 1834 to 1844 constitute changes to design (not performance) specifications from the original plans for the project. (Plaintiff's Exhibit 17; Defendant's Exhibit D-114; F.O.F. 151-166; Board Finding).

168. By changing the original plans for roadway shoulder renovation between Stations 1820 – 1844 and then failing to timely provide direction and/or plans adequate to construct the changes to the roadway shoulder work (as described above in Findings of Fact 151-167) PennDOT failed to provide plans (i.e. design specifications) adequate to construct the roadway (as modified) in a timely manner, failed to take steps necessary to progress the project and actively interfered with Knorr's shoulder renovation work on the project. (F.O.F. 151-167; Board Finding).

169. However, PennDOT's change to the original plans for roadway shoulder renovation between Stations 1834 – 1844 by expanding the width of the shoulder outward did not materially alter the ability of Knorr to maintain (or fail to maintain) two travel lanes for traffic and did not cause Knorr to incur a material increase in MPT costs for this revised shoulder renovation. (Defendant's Exhibit 115 (pp. 39-42 with attachments); F.O.F. 151-168; Board Finding).

170. PennDOT's change to the original plans for roadway shoulder renovation between Stations 1820 – 1844 did not materially alter the ability of Knorr to maintain (or fail to maintain) two travel lanes for traffic and did not cause Knorr to incur a material increase in MPT costs for this revised shoulder renovation. (Defendant's Exhibit 115 (pp. 39-42 with attachments); F.O.F. 151-168; Board Finding).

171. At the time PennDOT proposed the changes to its method of widening the roadway shoulder, PennDOT stated it would pay Knorr a Class 1 excavation rate for the extra excavation involved. Mr. Knorr stated he would not accept the Class 1 excavation rate because the excavation needed to widen the roadway shoulder was a more expensive, time-consuming type of excavation. Mr. Knorr contended that Knorr should be paid the higher Class 1B excavation rate. (408 Specifications § 203.1; N.T. 533-34, 1072-73).

172. Class 1 Excavation is defined as:

> * Excavation as shown on the Standard Drawings, for roadways, shoulders, ditches, drainage structures, stream channels, grade separation structures, retaining walls, and wingwalls.
>
> * Excavation, as indicated or directed, for benches, for the placement of topsoil, for the removal of topsoil, and for the removal of existing pavements not being rehabilitated.
>
> * Excavation, as indicated or directed, for the removal of unsuitable material having a bottom width of 8 feet or more.
>
> * Removal of unforeseen slides and rock ledges.
>
> * Removal of stone fences, piles of dirt or stones, individual boulders, and any portions of structures above the natural ground, when in excess of ½ cubic yard volume.

(408 Specifications § 203.1(a)).

173. Class 1B Excavation is defined as: "For roadway rehabilitation, sawcutting and removal of existing pavement to neat lines, as indicated or directed." (408 Specifications § 203.1(c)).

174. The Contract and plan provisions cited by PennDOT and its expert, Mr. Eberhardt, in support of its position that the extra excavation occasioned by the change of roadway shoulder design specifications between Stations 1820 to 1844 was Class 1 instead of Class 1B are ambiguous at best. (Defendant's Exhibit D-114 (pp. 58-63); Board Findings).

175. Because the additional full-depth widening performed by Knorr on the project involved milling to a neat cut along existing pavement in order to facilitate connecting the joint between old and new pavement, the excavation was more akin to the rehabilitation of the existing roadway shoulder described as Class 1B in the 408 Specifications, as opposed to the bulk excavation described as Class 1. (N.T. 649-54, 1072-75; F.O.F. 151-174; Board Finding).

176. Knorr performed (under protest) 672 cubic yards of Class 1B excavation for which it was only compensated at a Class 1 excavation rate. The unit price for Class 1 excavation on this project was $9 per cubic yard, and the unit price for Class 1B excavation on this project was $45 per cubic yard. The difference amounts to $24,202. (408 Specifications § 203.1; Plaintiff's Exhibit 277 (pp. 68-69); N.T. 533-34, 1072-73).

PennDOT's Delay in Supplying Missing Roadway Grades/Elevations in the Vicinity of the Box Culvert

177. The Contract plans called for the demolition and replacement of an existing bridge structure crossing a small creek called Bostonia Run between Stations 1851 and 1852. The new bridge was to be fabricated from matching pre-cast concrete box culvert sections and was to be installed in two phases so as to allow one travel lane for traffic at all times. (Plaintiff's Exhibit 17, 268A, 271C.)

178. Work on Phase II of the box culvert could not commence until the Phase I half of the bridge was demolished and the Phase I box culvert sections installed. (N.T. 544, 546).

179. The D-476 schedule (as adjusted) showed that work on Phase I of the box culvert was to commence on August 24, 1999 and end on September 24, 1999. Work on Phase II was to begin on October 1, 1999 and be completed on November 7, 1999. (Plaintiff's Exhibit 119).

180. During the late Summer of 1999, however, Knorr decided to delay replacement of the box culvert until the Spring of 2000 and institute a suspension of work on the project for the Winter (i.e. the "Winter Shutdown") for reasons discussed elsewhere in this Opinion. (Plaintiff's Exhibit 3, 119; N.T. 139-47, 789; F.O.F. 26-39).

181. On or about March 15, 2000, Knorr re-mobilized after its Winter Shutdown and commenced working on the box culvert bridge. After shifting traffic over to the Phase II traffic lane and removing the Phase I lane portion of the bridge, Knorr constructed the concrete footers for the Phase I box segments on March 28, 2000. Knorr set the Phase I lane box in place on April 12, 2000. (Defendant's Exhibit D-115 (p. 37)).

182. Sometime shortly before Knorr set the Phase I box culvert section in place, Knorr employees apparently found incorrect elevations for a portion of the roadway running up to and around this box culvert. The April 11, 2000 field diary of Brian Heeter, a PennDOT transportation construction inspector, confirmed that new grades did not match up with the cross-sections and profiles in the area of the box culvert. This diary also notes that he was traveling to the Engineering District 10-0 office for a meeting with Joe Yevchek (a PennDOT design engineer) to review "blown" elevation(s) near the area of the box culvert. Finally, Mr. Heeter's diary entry also noted that he would send new elevations to Knorr in order to construct the roadway over the box culvert. (Plaintiff's Exhibit 181; N.T. 393-96, 1018; Board Finding).

183. The problems with the roadway grades/elevations between Stations 1848 to 1854 (the roadway area around and over the box culvert) persisted through April 2000. Not only were these elevations inconsistent or missing but the grades/elevations for the centerline of the roadway also conflicted with corresponding elevations needed to deal with drainage problems for a diner parking lot adjacent to the roadway near the box culvert. (Plaintiff's Exhibits 144, 183, 184, 187, 188, 189; N.T. 1017-1024, 1957-1967; Board Finding).

184. On or about May 17, 2000, Knorr finished backfilling the site of the Phase I box culvert section. However, because of uncertainty regarding grades/elevation around the box culvert no further work (e.g. final sub-base and paving work) was performed on or around the box culvert until Knorr received revised grades and elevations for the area from Stations 1845 to 1854. (Plaintiff's Exhibit 183, 184, 187, 188, 189; Defendant's Exhibit D-115 (p. 37)).

185. On June 9, 2000, Mr. Knorr noted in his diary that Knorr had not yet received corrected roadway grades/elevations for the area around the box culvert. (Plaintiff's Exhibit 183).

186. On June 14, 2000, Eric Moore, at the time a PennDOT civil engineer trainee on the project, noted that Joe Yevchek of the Engineering District 10-0 design unit would be stopping at the project site to drop off roadway grades for the roadway running over the box culvert. Mr. Yevchek did stop by that afternoon to discuss the grade/elevation changes, but did not leave a final copy of roadway grades for the box culvert area. (Plaintiff's Exhibit 184; N.T. 1019).

187. On June 21, 2000, Mr. Knorr noted in his diary that Knorr had still not received roadway grades for the area at issue around the box culvert. (Plaintiff's Exhibit 183).

188. On June 27, 2000, Mr. Knorr noted in his diary that Knorr was instructed to work in an area other than the box culvert because Knorr had not yet received the final design for the roadway grades in that area. (Plaintiff's Exhibit 183).

189. By letter dated July 6, 2000, Knorr informed PennDOT that it had not yet received needed grades/elevations for the Stations 1845 to 1854, and repeated its request for a time extension previously requested in a letter of May 8, 2000. (Plaintiff's Exhibit 188; N.T. 30).

190. Knorr asserts that, on or about July 10, 2000, it finally received the corrected roadway grades/elevations for Stations 1848+50 to 1853+50. (Plaintiff's Exhibit 188, 191; N.T. 538-541, 1020-21).

191. PennDOT, and particularly Mr. Heeter, assert that all missing and/or corrective grades/elevations for the roadway adjacent to and over the box culvert were provided to Knorr in April of 2000. (Defendant's Exhibit D-64, D-102; N.T. 1237-1239, 1246-1250).

192. Based on the witnesses' testimony and totality of the evidence presented, the Board finds that the final corrected grades/elevations needed to construct the roadway adjacent to the box culvert were not provided to Knorr until on or about July 10, 2000. (Plaintiff's Exhibit 17, 144, 183, 184, 187, 188, 189; Defendant's Exhibit D-102, D-114; N.T. 1386-1405, 1406-1407, 1408-1414, 1669-1672; F.O.F. 177-191; Board Finding).

193. Within one or two days of receiving the corrected roadway grades/elevations, Knorr commenced the work necessary to begin paving the Phase I lane of the box culvert (e.g., excavation of the roadway approaching the box culvert, shoulder widening, locating and pouring curbs, and placing sub-base material). This work progressed through August 2, 2000, at which time Knorr paved the Phase I lane portion of the box culvert bridge. (N.T. 1021-23).

194. On or about August 7, 2000, Knorr switched traffic over to the Phase I travel lane and commenced work on Phase II of the box culvert. (Defendant's Exhibit 105).

195. Phase II of the box culvert was completed sometime in late August or early September 2000. (N.T. 1023).

196. As an additional defense on this issue, PennDOT points to Knorr's decision to modify the D-476 schedule and defer the box culvert work from Fall 1999 to Spring 2000 and to Knorr's own inefficiencies as a cause of delay concerning the box culvert. Specifically, PennDOT asserts that, with sufficient effort, the box culvert and the distribution slab that covered it could have been installed during the Fall and Winter of 1999 without any sub-base, blacktop or permanent paving layers by backfilling up against the box and putting a temporary leveling course from the roadway up to the distribution slab. According to PennDOT, this method would have permitted traffic to traverse that stretch of road without having to pave during the Winter (as proscribed by 408 Specifications) or attend to the elevations and roadway grades between Stations 1848+50 to 1853+50 at that time. (Defendant's F.O.F. 309-314; Plaintiff's Exhibit 119; N.T. 1559, 1655-57).

197. The Board agrees with PennDOT, in part, and finds that the distribution slab on top of the box culvert could have handled traffic without any additional paving being placed on top of it and that temporary asphalt work of some type might have been placed up to the box culvert to allow passage of traffic had Knorr attempted to do this box culvert replacement work commencing in the Summer and Fall of 1999 as scheduled on the D-476. (N.T. 1559, 1656-57).

198. However, we also agree with Knorr's assertion (and so find) that the shop drawings necessary to construct the box culvert bridge could not reasonably have been prepared (by Knorr, vendor or manufacturer of the box culvert), approved by PennDOT, and then the box culvert pieces manufactured in the 12 days between the August 12, 1999 Notice to Proceed and the August 24, 1999 date on which work on the box culvert was to commence. (Plaintiff's Exhibit 119; N.T. 140-41, 144-45, 147-48; Board Finding).

199. In fact, given the late September 1999 approval of the shop drawings by PennDOT (which we find to have been accomplished by Knorr and PennDOT in good time), it is clear to the Board that the manufacture of the box culvert sections by a third party vendor (with other work and production schedule of its own) would have pushed delivery of the box culvert piece to the project site to sometime in mid to late October 1999, thereby pushing the realistic box culvert completion date well into the dead of Winter in late December 1999 or early January 2000. (Plaintiff's Exhibit 119; N.T. 140-48; F.O.F. 26-39, 196-198; Board Finding).

200. In light of the probability that work commenced on the box culvert per the D-476 schedule would have extended well into the deep of Winter and the need for single lane traffic during this time, we find Knorr's decision to defer box culvert construction over concern with traffic protection and safety to be well founded and reasonable. (Plaintiff's Exhibit 119; N.T. 144-45, 789, 791; F.O.F. 26-39, 196-199; Board Finding).

201. Mr. Knorr's desire to maintain two lanes of traffic over the box culvert in order to allow for the maximum excavation of dirt during the early phase of the SR28 project was also a reasonable goal given the fact that the box culvert could not have been completed according to the time constraints in the D-476 schedule. (N.T. 139, 143-45; F.O.F. 26-39, 196-200; Board Finding).

202. Moreover, given PennDOT's argument that work on the box culvert could have been prosecuted in Winter by utilizing temporary paving, it has failed to persuade the Board that had Knorr commenced installation of the box culvert in the Fall and Winter of 1999, it would necessarily have discovered the missing or inconsistent grades/elevations between Stations 1848 and 1854 earlier than it did because Knorr's roadway work at the point would have been prosecuted on a temporary basis where final grades would not have been necessary. (F.O.F. 196-201; Board Finding).

203. Given the totality of the circumstances, Knorr's decision to postpone the installation of the box culvert until Spring 2000 and accelerate its work on the bulk excavation was a reasonable effort by Knorr to maintain the D-476 schedule overall by substituting accelerated excavation and drainage work for box culvert replacement. (Plaintiff's Exhibit 119; N.T. 789, 791; F.O.F. 26-39; 196-202; Board Finding).

204. As noted at Findings of Fact 26-39 and elsewhere in this Opinion, the Board has found that Knorr's Winter Shutdown was reasonable and well-founded under the circumstances and that it was not a material factor in delaying completion of the SR28 project. For the same reasons, and those enumerated more specifically above in Findings of Fact 196-203, we also find that Knorr's decision to delay replacement of the box culvert until Spring 2000 was reasonable and well-founded under the circumstances and was not a material factor in delaying discovery and resolution of the missing or incorrect grades/elevations around the box culvert or in delaying completion of the SR28 project. (Plaintiff's Exhibit 119; F.O.F. 26-39, 196-203; Board Finding).

205. In any event, PennDOT's actions acknowledge that it had the responsibility to provide Knorr with plans (including full roadway grades/elevations) correctly showing how the roadway was to be constructed around the box culvert. The plans originally provided by PennDOT contained missing and/or inconsistent grades/elevations and were materially inadequate to construct the roadway around the box culvert. PennDOT did not correct this material inadequacy in its plans with respect to the roadway grades/elevations between Stations 1848 and 1854 until on or about July 10, 2000. (F.O.F. 177-192; Board Finding).

206. PennDOT therefore, caused the delays and disruptions to the paving operations on the roadway around the box culvert because of its failure to supply adequate roadway grades/elevations to construct the roadway around the box culvert in a timely manner. This failure, which delayed and disrupted Knorr's sub-base and paving work between Stations 1848 and 1854 persisted from on or about April 11, 2000 (the date on which PennDOT was informed of missing/inconsistent roadway grades and elevations) until July 10, 2000 (the date on which Knorr finally received the corrected grades/elevations necessary for paving and sub-base work to progress in these areas). (F.O.F. 177-205; Board Finding).

207. By failing to supply the necessary roadway grades/elevations in a timely manner as noted in Findings of Facts 177-206 above, PennDOT failed to provide plans (i.e. design specifications) adequate to construct the roadway in a timely manner, failed to take steps necessary to progress the project and actively interfered with Knorr's sub-base and paving operations around the box culvert. (F.O.F. 177-206; Board Finding).

PennDOT's Untimely "Semi-Final Inspection"

208. Section 110.08 of the 408 Specifications states in relevant part:

> (a) Final Inspection. When the project is substantially complete, make arrangements for a mutual final inspection. Substantial completion is the date when at least 90% of the contract work has been completed and the project can be used, occupied or operated for its intended use.
>
> At the time of final inspection, the Engineer, along with the Contractor, will establish the following:
>
> The date of final inspection;
> The list of all physical work items, by stations and in detail, requiring completion and/or correction; and
>
> A list of all certificates and documents requiring submission, completion and/or correction.

(408 Specifications § 110.08a).

209. On November 8, 2000, Knorr requested from PennDOT a semi-final inspection of its work on the project. (Plaintiff's Exhibit 116; N.T. 1036).

210. By letter dated November 17, 2000, PennDOT notified Knorr that a semi-final inspection meeting would take place on December 7, 2000 at the project field office. (Plaintiff's Exhibit 116).

211. The semi-final inspection meeting was held on December 7, 2000, at the SR28 project field office. (Plaintiff's Exhibit 116).

212. At the semi-final inspection meeting, a list of work items was produced which Knorr had to complete in order finish the project. This list included work that was to be completed under the original Contract and extra work that was to be paid via force-account payments. (Defendant's Exhibit 3; Plaintiff's Exhibit 241 (Attachment 1); N.T. 115-17, 279-80).

213. Work on the SR28 project was considered to be substantially complete as of the December 7, 2001 inspection. (N.T. 1036, 1758, 1895).

214. Knorr asserts that PennDOT delayed completion of the project by delaying the inspection requested by Knorr on November 8, 2000 until December 7, 2000. (Plaintiff's F.O.F. 123-126).

215. Section 110.08 of the 408 Specifications does not set forth a time limit within which a final inspection must occur, stating only that the date of inspection must be "mutual." (408 Specifications § 110.08).

216. The evidence presented at trial does not set forth the considerations that went into the decision to schedule the semi-final inspection for December 7, 2000. (Board Finding).

217. The evidence presented at trial does not show that Knorr requested an earlier date for the semi-final inspection or otherwise objected to the December 7, 2000 date. (Board Finding).

218. The Board does not find the lapse of time between Knorr's request for semi-final inspection (November 8, 2000) and the holding of the inspection (December 7, 2000) to be an unreasonable amount of time between the two, particularly in light of Knorr's failure to object to same at the time. (F.O.F. 208-217; Board Finding).

219. Although Mr. Rhodes, Knorr's expert on construction delays and damages, stated that Knorr suffered about 10% of its total delay damages between the period of November 8 and December 7, 2000, neither Knorr or Mr. Rhodes itemized or otherwise described the equipment and manpower that allegedly remained mobilized during this period of time. (N.T. 1033-38; Board Finding).

220. The evidence presented at trial is insufficient to show that PennDOT unduly delayed the semi-final inspection or that Knorr incurred damages as a result. (F.O.F. 208-219; Board Finding).

Knorr's Self-Inflicted Problems

221. Knorr also created for itself a significant portion of the delay and disruption it experienced on the SR28 project by reason of, inter alia, its own mistakes in construction of the roadway and adjacent structures as well as ongoing problems with equipment breakdown and/or malfunction, flawed work procedures, multiple changes in supervisor and foremen and work being re-done or corrected. Notable among these problems were those experienced with its paving machine malfunctions causing it difficulty with properly laying OGS and its base asphalt materials. (Defendant's Exhibit 115 (pp. 77-78), and attachment 63; N.T. 2141-2143; Board Finding).

Knorr's Claimed Damages

222. Knorr and its expert, Mr. Rhodes, identify the following seven problems which occurred on the SR28 project and persisted for the time periods indicated as the cause of disruption to Knorr's work and the 116 days of total delay to substantial completion of the SR28 project:

(1) Missing/incorrect grades (other than noted specifically below)[5]	-	3/15/00 to 4/4/00	20 days
(2) OGS Supplier	-	3/20/00 to 5/8/00	49 days
(3) Slope Repairs	-	3/22/00 to 6/26/00	96 days
(4) Box Culvert Grades	-	4/20/00 to 7/10/00	81 days
(5) Redesign (1820 to 1834)	-	5/1/00 to 5/9/00	8 days
(6) Awaiting Grades (1834 to 1842)	-	5/1/00 to 7/19/00	79 days
(7) Semi-Final Inspection	-	11/8/00 to 12/7/00	29 days

(Plaintiff's Exhibit 277; Board Finding).

223. With the exceptions noted below in Findings of Facts 224-231, the Board finds Mr. Rhodes' testimony and report to be generally credible with respect to his attribution of the 116 days of total project delay to the seven problem issues (and durations of each) noted above and summarized in Findings of Fact 222. (Plaintiff Exhibit 277; N.T.919-71, 980-1147, 2092-2153; F.O.F. 222, 224-231; Board Finding).

224. Knorr's self-inflicted problems noted above in Findings of Fact 221 materially contributed to the delay and disruptions it experienced on this project. (F.O.F. 221; Board Finding).

225. The Board also finds that: (1) PennDOT was not unreasonable in scheduling the semi-final inspection when it did; and (2) any delay caused by the OGS issue, for which we did not find PennDOT responsible, was subsumed by the remaining five problems identified by Knorr/Rhodes and summarized above in Findings of Fact 222 (as items 1,3,4,5 and 6) and Knorr's self-inflicted problems identified by PennDOT/Eberhardt as noted above in Findings of Fact 221. (Plaintiff's Exhibit 277; F.O.F. 86-98, 99-129, 151-176, 177-201, 221-222; Board Finding).

226. Because the claimed 29 days of delay caused by the scheduling of the semi-final inspection occurred near the end of the SR28 project, the Board finds that the other delays and disruptions had largely run their course by November 8, 2000 (the date Knorr requested semi-final inspection). Therefore, the Board will subtract the entire 29 days Knorr waited for semi-final inspection from the 116 days of claimed delay, leaving 87 days of project delay that we find were caused Knorr by the five remaining problems summarized in Findings of Fact 222 (items 1,3,4,5 and 6) and Knorr's self-inflicted problems identified by PennDOT as noted above in Findings of Fact 221 described above. (F.O.F. 86-98, 99-129, 151-176, 177-207, 208-220, 221, 222-225; Board Finding).

227. The five remaining problems summarized in Findings of Fact 222 (items 1,3,4,5 and 6) and described above were caused by PennDOT's active interference with Knorr's work. (F.O.F. 86-98, 99-129, 151-176, 177-207, 222; Board Finding).

[5] This category was argued by Knorr to be a separate category of impact and delay, even though it was not listed as a separate category in Mr. Rhodes' expert report.

228. Specifically, the Board finds that PennDOT actively interfered with Knorr's roadway construction work by the following actions/inactions of PennDOT: (1) PennDOT's multiple failures to timely provide necessary roadway grades and elevations; (2) PennDOT's failure to timely address slope repair issues; (3) PennDOT's failure to timely confirm the change in construction of roadway shoulders to full-depth widening between Stations 1820 and 1834; (4) PennDOT's failure to timely supply roadway grades and elevations for the expanded full-depth widening between Stations 1834 and 1844; and (5) PennDOT's failure to timely supply the missing or corrected roadway grades for Stations 1848 to 1854 surrounding the box culvert bridge. (Plaintiff's Exhibit 277; F.O.F. 86-98, 99-129, 151-176, 177-207, 222; Board Finding).

229. The Board further finds that the five problems caused by PennDOT noted above and summarized at Findings of Fact 228 and the self-inflicted problems caused by Knorr summarized at Findings of Fact 221 together caused Knorr 87 days of delay to completion of the project. (Plaintiff's Exhibit 227; Defendant's Exhibit D-115; F.O.F. 86-98, 99-129, 151-176, 177-207, 208-220, 221, 222-228; Board Finding).

230. Based on the evidence as a whole, the Board finds that five-sixths of the 87 days of project delay (i.e. 72 days) were caused by the five problem areas created by PennDOT's active interference and one-sixth of the 87 days of delay (i.e. 15 days) were caused by Knorr. (Plaintiff's Exhibit 277; Defendant's Exhibit D-115; F.O.F. 86-98, 99-129, 151-176, 177-207, 208-220, 221, 222-229; Board Finding).

231. Comparing 72 days of actual delay which we attribute to PennDOT to the total delay damages claimed by Knorr for the 116 days of delay claimed by Knorr, we further find that PennDOT caused only 62% of Knorr's actual delay damages. (Plaintiff's Exhibit 277; F.O.F. 222-230; Board Finding).

Knorr's Delay Damages

232. Knorr's first category of claimed damages is delay damages. For the categories of Extended Supervision, Extended Equipment, and Extended Maintenance and Protection of Traffic, Knorr claims a total of $301,876.00 in delay damages based on 116 days of claimed delay. (Plaintiff's Exhibit 277 (pp. 58-63)).

233. However, because we have found that PennDOT is responsible for only 72 of the 116-days of delay on the project, we find that only 62% of the delay damages actually incurred by Knorr is attributable to PennDOT. (F.O.F. 222-231; Board Finding).

234. Additionally, while we find the delay damage calculation performed by Mr. Rhodes for extended supervision, extended equipment and extended maintenance and protection of traffic costs to be a generally credible and adequately substantiated, we also find that certain adjustments to these calculations are needed in order to more accurately reflect the actual damages incurred by Knorr as a result of the project delay. (Plaintiff's Exhibit 277; Defendant's Exhibit D-115 and D-116; N.T. 2010-80; F.O.F. 222-231; Board Finding).

235. For the category of Extended Supervision, Knorr claims $32,647 in delay damages. That figure equals $22,975 of labor costs plus a 40% markup and an additional markup of 1.5% for bond costs.[6] (Plaintiff's Exhibit 277 (p. 61)).

236. Pursuant to the force account markup provisions contained in Section 110.03(d)(7) of the 408 Specifications, Mr. Rhodes added a 40% markup to the costs of Extended Supervision. The Board finds that because use of force account markups is frequently employed by both PennDOT and contractors to calculate payments due for extra work presented as damage claims, we find that use of these markups in Section 110.03(d)(7) is reasonable and appropriate to calculate Knorr's Extended Supervision delay damages in this case. (408 Specifications § 110.03(d)(7); Plaintiff's Exhibit 277 (p. 61); N.T. 1049-51;Board Finding).

237. However, because the 40% markup contained in Section 110.03(d)(7) already includes the cost of a bond markup, the damages claimed for Extended Supervision will be reduced by the 1.5% bond markup. Therefore, the Extended Supervision damages incurred by Knorr for the entire 116 day delay period equals $32,164. (408 Specifications §110.03(d)(7); Plaintiff's Exhibit 277 (p. 61); Board Finding).

238. For the category of Extended Equipment, Knorr claims $146,407 in delay damages. This figure equals the $137,375 in equipment costs plus a 5% markup and an additional 1.5% markup for bond costs.[7] (Plaintiff's Exhibit 277 (p. 62)).

239. The Board adopts the 5% markup to equipment cost per Section 110.03(d)(7) of the 408 Specifications and subtracts the 1.5% bond cost for the reasons explained above. This leaves $144,244 as the interim amount claimed for Extended Equipment costs. (408 Specifications § 110.03(d)(7); Board Finding; See also footnotes 6 and 7).

240. We credit the testimony of Mr. Rhodes and find that although the specific pieces of equipment utilized in the extended delay period are not individually listed in his report, the actual cost of this equipment (i.e. the depreciation and/or rental charge plus the cost to own and maintain the equipment) is accurately reflected by the cost code for the specific task identified in his report's extended equipment cost listing. (Plaintiff's Exhibit 277; Defendant's Exhibit D-116; N.T. 1051-55; Board Finding).

241. However, the Board will eliminate from the Extended Equipment total the $29,581 figure listed for "Equipment Maintenance and Repairs" because we find this item to be duplicative of the ownership and maintenance costs already contained in the remaining items

[6] Knorr's and PennDOT's experts ultimately agreed at hearing that the dollar figures for the categories of damages represented by Extended Supervision, Extended Equipment, Extended Maintenance and Protection of Traffic, Paving and Sub-base Inefficiency, and Maintenance and Protection of Traffic Inefficiency should be reduced to reflect an actual bond percentage of 1.09% of the total of each of those category of damages rather than the 1.5% utilized in Mr. Rhodes' report. (See N.T. 1093; Plaintiff's Exhibit 277). Because of our utilization of the markups prescribed by Section 110.03(d)(7) of the 408 Specifications, which subsumes the bond markup, this adjustment becomes moot.

[7] The "mark-up" figure on page 62 of Plaintiff's Exhibit 277 (Andrew Rhodes' expert report) shows a 10% markup, but $6,869 is only 5% of $137,375, as provided for in Section 110.03(d)(7) of the 408 Specifications. The 10% is a typo, as only a 5% markup was actually applied.

listed in the Extended Equipment costs as presented by Mr. Rhodes. (Plaintiff's Exhibit 277; Defendant's Exhibit D-116; N.T. 1051-55; Board Finding).

242. The Extended Equipment damages incurred by Knorr for the entire 116 day delay period equals $113,184. (Plaintiff's Exhibit 277 (p. 62); F.O.F. 231-234; Board Finding).

243. For the category of Extended Maintenance and Protection of Traffic, Knorr claims $122,822 in delay damages. This figure is calculated from $92,976 in labor and material costs, plus a "blended" 30.15% markup on the actual mix of labor and material costs, plus the 1.5% bond markup. (Plaintiff's Exhibit 277 (p. 64)).

244. The Board finds that instead of utilizing Mr. Rhodes' blended markup rate of 30.15% for the "mix" of labor and material costs, the proper markups (as prescribed in Section 110.03(d)(7) of the 408 Specifications) are 40% for labor and 25% for material costs. In addition, the Board will eliminate the 1.5% bond cost for the previously indicated reasons. (408 Specifications § 110.03(d)(7); Plaintiff's Exhibit 277 (p. 64) (See footnote 6); F.O.F. 234-237, 239; Board Finding).

245. Thus, according to the foregoing calculations, the Extended Maintenance and Protection of Traffic damages incurred by Knorr for the entire 116 day period equals $126,457. (Plaintiff's Exhibit 277 (p. 64); F.O.F. 243-244; Board Finding).

246. As set forth above, the Board finds that Knorr incurred damages for Extended Supervision, Extended Equipment, and Extended Maintenance and Protection of Traffic for the entire 116 day delay period of $271,805. Of this total extended cost, the 62% attributable to PennDOT's active interference with Knorr's work equals $168,519. (Plaintiff Exhibit 277; F.O.F. 222-245; Board Finding).

247. With regard to Knorr's claim for Extended Home Office Overhead of $100,818,[8] the Board finds that Knorr's adoption of the markup percentages in Section 110.03(d)(7) of the 408 Specifications specifically includes the cost of general administrative overhead. Accordingly, the Board finds Knorr's separate claim for extended home office overhead to be duplicative of its claims with markup. (408 Specifications § 110.03(d)(7); Plaintiff's Exhibit 277 (p. 65); F.O.F. 222-246; Board Finding).

248. The total delay related damages caused Knorr by PennDOT's active interference with its work is $168,519. (Plaintiff's Exhibit 277; F.O.F. 222-247; Board Finding).

[8] Knorr's calculation of its Extended Home Office Overhead, on page 65 of Plaintiff's Exhibit 277, shows Estimated Costs in Extended Timeframe ($1,482,615) x Home Office Overhead Percentage (6.8%) = Total Extended Home Office Overhead Costs ($101,228). By this calculation, the correct figure for Total Extended Home Office Overhead Costs is $100,818.

Knorr's Claimed Disruption-Related Damages

249. Knorr also claims a total of $422,170 in disruption-related damages, consisting of $284,276 in paving and sub-base work inefficiency; $113,692 in maintenance and protection of traffic inefficiency; and $24,202 in additional excavation costs. (Plaintiff's Exhibit 277 (pp. 65-77); N.T. 1071-72).

250. Knorr asserts, and the Board finds, that the same five problems caused by PennDOT actions/inactions which delayed Knorr's work on the project (and which we identify above and summarize in Findings of Fact 228 above as active interference with Knorr's work and Knorr's own self-inflicted problems which we identify above and summarize in Findings of Fact 221, together, also disrupted and interfered with Knorr's work and caused it to incur substantial additional costs for said disruption and work inefficiencies in the same five-sixth to one-sixth ratio. (Plaintiff's Exhibit 277; N.T. 1072-78, 1083-94; F.O.F. 86-98, 99-129, 151-176, 177-207, 208-220, 221, 222-231; Board Finding).

251. Specifically, this active interference by PennDOT (delineated in Findings of Fact 228 and elsewhere) and Knorr's own self-inflicted problems which we identify above and summarize in Findings of Fact 221, together required Knorr: 1) to excavate and pave the roadway and shoulders in a piecemeal fashion, rather than in a linear and continuous manner as originally contemplated and to work in more crowded conditions; and 2) to shift back and forth between paving and excavation work, all of which disrupted Knorr's planned, continuous work flow and caused inefficient construction and execution of the Contract. (Plaintiff's Exhibit 277; N.T. 1072-78, 1083-94; F.O.F. 86-98, 99-128, 151-176, 177-207, 208-220, 221, 222-231, 250; Board Finding).

252. PennDOT's active interference with Knorr's work caused five-sixths (83%) of the inefficiencies (or disruption-related) damages actually experienced by Knorr on the project. (F.O.F. 86-98, 99-128, 151-176, 177-207, 208-220, 221, 222-231, 250-251; Board Finding).

253. For the category of Paving and Sub-base Inefficiency, Knorr claims $284,276 in disruption-related damages. (Plaintiff's Exhibit 277 (p. 73)).

254. Mr. Rhodes, Knorr's expert on construction delays, disruptions and damages, used a "measured mile" methodology in calculating Knorr's damages in this paving and sub-base category. The measured mile methodology compares the contractor's performance during an "impacted" period of a project with the performance achieved during a relatively "unimpacted" period of performance. An "impacted" period is a period of work during which it is claimed that a contractor suffered owner-induced inefficiencies. The measured mile methodology generates a performance measurement (e.g., the number of hours worked or cost per square yard or ton of paving placed), calculates the performance measurement for the baseline (unimpacted) period, and compares it to the performance measurement during the impacted period. (Plaintiff's Exhibit 277 (pp. 71-74); N.T. 1075-76, 1082; Board Finding).

255. Mr. Rhodes used the period from May 2000 through August 2000 as the "impacted" period of performance because, during this period, Knorr's work was substantially disrupted by the five PennDOT acts and omissions considered by the Board to be active interference (Per Findings of Fact 218). Mr. Rhodes used the period from September 1, 2000,

through October 31, 2000, for the baseline (unimpacted) period, because he found the problems had been substantially resolved by that time. (Plaintiff's Exhibit 277 (p. 72); N.T. 1075-76).

256. Mr. Rhodes compared Knorr's sub-base and paving work in the two periods of time based on cost per square yard of paving material placed and on the cost per ton of paving material placed.[9] The Board finds these calculations to be reasonably accurate and credible as a measure of the relative inefficiency experienced by Knorr in its sub-base and paving operations affected by the five problems we have found to constitute active interference by PennDOT with Knorr's work and Knorr's own self-inflicted problems. (N.T. 1076-80; Plaintiff's Exhibit 277 (p. 73); F.O.F. 249-255; Board Finding).

257. The Board further finds that our disallowance of the OGS claim is immaterial to a calculation of Knorr's disruption because the effects of that issue were subsumed by other problems during construction. Similarly, elimination of the 29 days claimed for delay in the semi-final inspection, occurring as it did at the end of the project, had no effect on the actual prosecution of Knorr's paving and sub-base work. (Plaintiff's Exhibit 277; F.O.F. 148-150, 208-220; Board Finding).

258. The remaining categories of PennDOT acts and omissions—specifically, PennDOT's: (1) multiple failures to timely provide necessary roadway grades and elevations; (2) failure to timely address slope instability and slope repair issues; (3) failure to timely confirm the change in construction of roadway shoulders to full-depth widening between Stations 1820 and 1834; (4) failure to timely supply roadway grades and elevations for the expanded full-depth widening between Stations 1834 and 1844; and (5) failure to timely supply the missing or corrected roadway grades for Stations 1848 to 1854 surrounding the box culvert bridge did, in fact, disrupt Knorr's sub-base and paving operations and caused 83% of the inefficiency damages actually incurred by Knorr for this work. (Plaintiff's Exhibit 277; N.T. 960-61, 966, 980-84, 1005-07, 1017-24, 1024-30, 1033; F.O.F. 249-257; Board Finding).

259. After having calculated the total cost of Knorr's inefficiency in its sub-base and paving operation at $232,306, Mr. Rhodes then applied a blended markup rate of 20.56% (arrived at by a weighted average of the labor used at 40% markup and the equipment used at 5% markup in these operations) and a 1.5% bond markup to arrive at a total inefficiency damage claim for sub-base and paving operations of $284,276. (N.T. 1080-83; Plaintiff's Exhibit 277 (p. 73); Board Finding).

260. The Board finds the blended markup rate of 20.56% on this work to be reasonable and appropriate per Mr. Rhodes explanation. (408 Specifications §110.03(d)(7); Plaintiff's Exhibit 277 (p. 73); N.T. 1080-83; Board Finding).

261. Accordingly, the Board finds Knorr incurred $280,075 in additional damages for paving and sub-base inefficiency calculated by removing only the 1.5% bond cost from the total claimed by Knorr, and that 83% thereof or $232,462 was caused by PennDOT's active

[9] Mr. Rhodes used the square yard comparison for all sub-base and paving work with a specifically defined depth. He used the tonnage comparison for work on the project that did not show a set depth on the plans (e.g. where Knorr was to apply sub-base and paving materials as needed to match adjacent road or shoulder heights and depths were not uniform). (N.T. 1078-80).

interference with Knorr's sub-base and paving operations. (Plaintiff's Exhibit 277 (p. 73); N.T.1075-78; F.O.F. 249-260; Board Finding).

262. For the category of Maintenance & Protection of Traffic Inefficiency, Knorr claims $113,692 in disruption-related damages. That figure equals additional unanticipated maintenance and protection of traffic costs of $86,063, a blended markup of 30.15% equal to $25,948, and a 1.5% bond amount. (Plaintiff's Exhibit 277 (p. 77); See also footnote 6).

263. Of the five problems created by PennDOT's active interference, Knorr argues that PennDOT's decision to change the planned specifications for shoulder reconstruction in mid-project for Stations 1820 to 1844 materially reduced the opportunity for two travel lanes during construction and was the material factor in increasing the additional unanticipated maintenance and protection of traffic costs. (Plaintiff's Exhibit 277; N.T. 531-33, 550-53, 654-56; F.O.F. 151-170, 249-262; Board Finding).

264. However, the Board finds Mr. Eberhardt's testimony and report to be more credible and persuasive on the issue of the extra costs for Knorr's maintenance and protection of traffic operation allegedly caused by PennDOT's change to the shoulder renovations between Station 1820-1844. Mr. Eberhardt explained his refutation of this component of disruption-related damages with persuasive reference to the project records. Specifically, Mr. Eberhardt established that the changes did not materially reduce the opportunity for two lane traffic as both the original as well as the revised procedures would have intruded into the adjacent travel lane. Moreover the renovation between Stations 1820-1834 was accomplished in only 44 hours. (Defendant's Exhibit D-115 at p. 39-43; Board Finding).

265. Knorr did not incur a material increase in its maintenance and protection of traffic costs as a result of PennDOT's decision to change its originally planned specifications for roadway shoulder renovation on the SR 28 project between Stations 1820 to 1844. (Plaintiff's Exhibit 277; Defendant's Exhibit D-115 (pp. 39-46); N.T. 531-33, 550-53, 654-56; F.O.F. 151-170, 249-264; Board Finding).

266. The last category of claims by Knorr is for Additional Work-Excavation. Knorr claims $24,202 in damages for this issue. (Plaintiff's Exhibit 277 (pp. 68-69)).

267. This claim for $24,202 for Additional Work-Excavation is based on Knorr's excavation of 672.29 cubic yards of dirt and other material associated mainly, with the "full-depth widening" of the roadway shoulder. (Plaintiff's Exhibit 277 (p. 70); N.T. 1072-75).

268. PennDOT compensated Knorr for the excavation of this 672.29 cubic yards of material at the Class 1 excavation rate, $9 per cubic yard. The Class 1B excavation rate is $45 per cubic yard. (Plaintiff's Exhibit 277 (pp. 68-69); N.T. 1072-1075).

269. The difference between Class 1B excavation rate ($45 per cubic yard) and the Class 1 excavation rate ($9 per cubic yard) is $36 per cubic yard. 672.29 cubic yards x $36 per cubic yard = $24,202. This amount is unaffected by Knorr's self-inflicted problems and no percentage reduction is appropriate. (Plaintiff's Exhibit 277 (pp. 68-69); N.T. 1074-75; Board Finding).

270. Because we have found that Knorr's excavation of the 672.29 cubic yards was Class 1B type excavation not Class 1. We also find that Knorr incurred damages for the category of Additional Work-Excavation in the amount of $24,202. (F.O.F. 151-176, 266-269; Board Finding).

271. The total amount of disruption related damages and additional work-excavation damages incurred by Knorr on this SR28 project by reason of PennDOT's active interference with its work is $256,664. (F.O.F. 249-270; Board Finding).

Summary of Damages

272. The Board has determined that, as a result of PennDOT's active interference in the five problem areas summarized above at Findings of Fact 228 and more fully described elsewhere in this opinion, Knorr has incurred: (1) $168,519 in total delay damages; (2) $232,462 in damages for paving and sub-base inefficiency; and (3) $24,202 in damages for additional work-excavation. (F.O.F. 222-271; Board Finding).

273. As a result of PennDOT's active interference in the five problem areas noted above at Findings of Fact 228 and more fully described elsewhere in this opinion, Knorr has incurred total damages (without interest) in the amount of $425,183. (F.O.F. 222-272; Board Finding).

PennDOT's Counterclaim for Construction Engineering Liquidated Damages

274. Section 108.07(a) of the 408 Specifications, relating to liquidated damages, states in relevant in part: "For each day that any physical work remains uncompleted after the Required Completion Date, the sum per day specified in the following schedule, unless otherwise stated in the proposal, will be deducted from money due or to become due. This deduction will not be as a penalty, but as Construction Engineering Liquidated Damages." (408 Specifications § 108.07(a) (amended March 15, 1995, Defendant's Exhibit D-7)).

275. As a result of the initial 10 day delay in the Notice to Proceed and an additional 61 day extension granted by PennDOT's letter of August 21, 2000, the extended required completion date for the SR28 project was October 13, 2000. (Plaintiff's Exhibit 128, 241 (p. 83); Defendant's Exhibit D-106; F.O.F. 13-14, 43; Board Finding).

276. The semi-final inspection meeting was held on December 7, 2000, at the SR28 project field office at which time Knorr's work on the SR28 project was substantially complete. (Plaintiff's Exhibit 116; Board Finding).

277. The last day of physical work on the SR28 project was performed on August 8, 2001. (Defendant's Exhibit D-106 at 83).

278. PennDOT asserts it is entitled to $194,350 in construction engineering liquidated damages at a rate of $650 per day for 299 days calculated from the extended project completion date (October 13, 2000) to August 8, 2001. (Plaintiff's Exhibit 241; Defendant's Exhibit 106 at 82-84; Defendant's Proposed Findings of Fact 450-461).

279. The PennDOT letter of August 21, 2000, which granted Knorr a 61 calendar day Contract extension (to October 13, 2000), accounted for only part of the 72 delay days which the Board has attributed to PennDOT. (Plaintiff's Exhibits 116, 128, 277; F.O.F. 221-231).

280. The Board has found that PennDOT caused Knorr 72 days of delay from August 13, 2000. (Plaintiff's Exhibit 277; F.O.F. 221-231; Board Finding).

281. PennDOT caused Contract work to be performed after the October 13, 2000 date from which it commences calculation of the construction engineering liquidated damages it now claims. (F.O.F. 221-231; Board Finding).

282. Further, while we have not found PennDOT liable for the additional 29 days of delay claimed by Knorr for the "delay" in scheduling a semi-final inspection from the time requested by Knorr, it was, nonetheless, PennDOT's decision to delay the semi-final inspection from November 8, 2000 to December 7, 2000, not Knorr's. (F.O.F. 208-220; Board Finding).

283. Knorr caused only 15 days of the delay in completion of the SR28 project up to December 7, 2000, the date on which the project was substantially complete. (Plaintiff's Exhibit 277; N.T. 106-107, 114-115; F.O.F. 221-231; Board Finding).

284. With the agreement of PennDOT, Knorr instituted a second winter shutdown and did not perform any work on the SR28 project from December 15, 2000, through May 13, 2001. (Plaintiff's Exhibit 241; Defendant's Exhibit D-106 p. 83-84; N.T. 106-126; Board Finding).

285. PennDOT agreed to put off the work until after the Winter of 2000-2001 because of the cold weather and because PennDOT had not obtained right-of-ways needed to conclude some of the work. (N.T. 106-126).

286. The work performed by Knorr after December 7, 2000 consisted of some punch list work, placing of topsoil and seeding, some small adjustments to one or two sections of the roadway, and a box culvert repair. (Plaintiff's Exhibit 241; Defendant's Exhibit D-106 p. 83-84; N.T. 106-126).

287. Based on Knorr's applications for payment, the total amount of contract work performed between December 7, 2000, and August 8, 2001, amounted to about 1% of the total Contract work. (N.T. 109-110).

288. During the Winter of 2000-2001 when PennDOT agreed to Knorr's second winter shutdown, PennDOT officials never discussed with Mr. Knorr the possibility that his firm would be subject to construction engineering liquidated damages for the minor amount of work not finished until the Summer of 2001. (N.T. 111-114).

289. Sarah Cunningham, then the PennDOT assistant construction engineer on the SR28 project, never informed Mr. Knorr, either verbally or in writing, that his company would be subject to construction engineering liquidated damages because of the work performed after October 13, 2000. (N.T. 111-114, 448-49).

290. Between December 7, 2000 and August 8, 2001, Knorr actually performed work on the SR28 project on only 32 separate days. (Plaintiff's Exhibit 241; Defendant's Exhibit D-106 p. 83-84).

291. Of those 32 days of work performed from December 7, 2000 to August 8, 2001, work performed on 13 of the days was paid for by force-account payments (i.e., the work was recognized by PennDOT as extra or additional work outside the scope of the Contract). These days of work cannot properly be considered late, unfinished Contract work for the purpose of assessing construction engineering liquidated damages. (Plaintiff's Exhibit 241; Defendant's Exhibit D-106 (pp. 83-84); N.T. 106-126; Board Finding).

292. PennDOT approved the force-account work performed by Knorr after the December 7, 2000 semi-final inspection of the SR28 project (Plaintiff's Exhibit 241; Defendant's Exhibit D-106 (pp. 83-84); N.T. 106-126; Board Finding).

293. Neither party has provided the Board with evidence to contradict or counter the Board's five-sixth to one-sixth apportionment of responsibility for the delay experienced on this project. Accordingly we find that, of the 19 days of Contract work actually performed by Knorr subsequent to substantial completion, 16 are attributable to PennDOT and only 3 attributable to Knorr. (Plaintiff's Exhibit 241; Defendant's Exhibit D-106 (pp. 83-84); N.T. 106-126; F.O.F. 221-231, 274-292; Board Finding).

294. John Fry, the PennDOT assistant district engineer who oversaw the SR28 project, and who would have had some role in assessing such damages against Knorr, never discussed the issue of construction engineering liquidated damages with any SR28 project personnel. (N.T. 248-251).

295. Section 110.08(c) of the 408 Specifications states:

> The Engineer will compute the entire amount of each contract work item performed and its contract value. The Engineer will notify the Contractor of the amount for each item, including additions to and deductions from the contract quantity for each item of work, all other legal and equitable additions and deductions to be made, amounts previously paid, and the net amount of the final settlement certificate computations.

(408 Specifications § 110.08(c)).

296. PennDOT issued its Notification of Final Quantities and Contract Settlement Amount, a document representing the final settlement and payment of the Contract for the SR28 project, on February 3, 2003. The document shows that PennDOT was assessing zero dollars for the amount of construction engineering liquidated damages. (Plaintiff's Exhibit 239; N.T. 126-128).

297. It was not until August 2005, well after Knorr had filed its claim here at the Board that Knorr was first notified by PennDOT that PennDOT would be seeking $194,350 in construction engineering liquidation damages. (N.T. 127-128, 1794-95).

298. The idea of assessing construction engineering liquidated damages against Knorr was first proposed by a member of Michael Baker Jr., Inc., PennDOT's construction engineering consultant firm for this litigation. (N.T. 1803-04).

299. Ralph Eberhardt, of Michael Baker Jr., Inc., PennDOT's expert on construction delays and damages, did not talk to John Fry, Sarah Cunningham, David Shaffer or Brian Heeter about assessing construction engineering liquidation damages against Knorr. (N.T. 1804-08).

300. The fundamental purpose of construction engineering liquidated damages is to approximate and offset the cost incurred by PennDOT to have site inspectors and personnel on an active job site while work is being performed after the anticipated completion date of the project. (408 Specifications, Section 108.07; Board Finding).

301. For the 15 days of delay caused by Knorr before substantial completion and the remaining 3 days of Contract work performed by Knorr from December 7, 2000 through August 8, 2001 actually caused by Knorr (as opposed to PennDOT), the assessment of a $194,350 liquidated damages amount is an unreasonably large penalty as the amount grossly exceeds PennDOT's cost of on site personnel for these days. (Plaintiff's Exhibit 241; Defendant's Exhibit D-106 (pp. 83-84); F.O.F. 221-231, 272-300; Board Finding).

302. The excessively large dollar amount in relation to the relatively minor amount of work and actual work days involved and the manner in which PennDOT has here asserted it (including PennDOT's initial decision not to assess construction engineering liquidation damages when it issued its Notification of Final Quantities and subsequent reversal following Knorr's claim filing at the Board) leads the Board to conclude that PennDOT's proposed application of construction engineering liquidated damages in this case in the amount of $194,350 would serve a mainly punitive rather than a compensatory purpose. (F.O.F. 221-231, 272-301; Board Finding).

303. It would not be punitive, but rather compensatory in nature, to assess construction engineering liquid damages of $650 per day against Knorr for a total of 18 days (comprised of the 15 days of delay Knorr caused prior to substantial completion on December 7, 2000 and for the 3 days of unfinished Contract work Knorr actually performed thereafter that were not caused by PennDOT). This results in total construction engineering liquidated damages of $11,700. (F.O.F. 221-231, 272-302; Board Finding).

304. Offsetting PennDOT's award of $11,700 in construction engineering liquidated damages for the SR28 project against Knorr's award of $425,183 results in a net award to Knorr of $413,483; and applying 6% per annum to this amount from July 25, 2003 to the date of this Order ($124,045) produces an award of $537,528 to Knorr. (Board Finding).

305. Neither party has established that any of the acts or omissions of the other were arbitrary or vexatious. (Board Finding).

CONCUSIONS OF LAW

1. The Board of Claims has exclusive jurisdiction to hear and determine this matter as a claim against the Commonwealth of Pennsylvania, Department of Transportation ("PennDOT"), arising from a contract entered into with the Commonwealth. Sections 1701-1751 of the Commonwealth Procurement Code, 62 Pa.C.S.A. §§ 1701-1751.

2. The Board of Claims has jurisdiction over the parties as well as the subject matter of the claim asserted by the plaintiff, Wayne Knorr, Inc. ("Knorr"). Id.

3. Knorr and PennDOT entered into a valid contract, Contract No. 101131, for the rehabilitation and expansion of an approximate two-mile section of State Road 28 ("SR28"), located in Armstrong County, Mahoning Township, Pennsylvania between the boroughs of Distant and South Bethlehem (the "Contract"). (Plaintiff's Exhibit 1; Stipulations Nos. 3 and 4; N.T. 48-49).

4. In asserting a claim for recovery on a breach of contract, it is the asserting party's burden to show that the facts exist to support the requested recovery. Paliotta v. Department of Transportation, 750 A.2d 388 (Pa. Cmwlth. 1999).

5. A material breach of contract is one that entitles the non-breaching party to suspend its performance. Widmer Engineering, Inc. v. Dufalla, 837 A.2d 459, 467 (Pa. Super. 2003).

6. Whether a breach of contract is so substantial as to justify an injured party's regarding the whole transaction as at an end is a question of degree and custom in regard to the type of contract at issue in the case. Lane Enterprises, Inc. v. L.B. Foster Co., 700 A.2d 465, 471 (Pa. Super. 1997).

7. The Contract for the SR28 project includes, inter alia, the yellow bound volume label Contract 101131 containing, among other things, the signatures of the parties; the schedule of prices and special provisions, and supplemental specifications sometimes referred to as the bound contract; in addition, referenced attachments (including the D-476) the plans, drawings and the 1994 Publication of 408 Specifications, sometimes referred to by the parties as the Publication 408 or 408 Specifications as amended or supplemented in the bound contract. (Plaintiff's Exhibit 1; Stipulations Nos. 3 and 4; N.T. 48-49).

8. In accordance with Section 108.03 of the 408 Specifications, the D-476 schedule included in the Contract documents became the schedule for use by Knorr on this project as Knorr did not present its own schedule. (Pub. 408 Specifications, Section 108.03; Plaintiff's Exhibit 1).

9. Knorr did not commit a material breach of the Contract by failing to submit a CPM schedule for this project because Knorr was not required to submit a CPM schedule and it chose to use the D-476 schedule as the official schedule for the SR28 project as provided for in the 408 Specifications. (Pub. 408 Specifications, Section 108.03; Plaintiff's Exhibit 1).

10. The "spoliation doctrine" is a rule of evidence stating that a party may not benefit from its own destruction or withholding of evidence. Koken v. Colonial Assurance Co., 885 A.2d 1078, 1100 n.7 (Pa. Cmwlth. 2005).

11. The spoliation doctrine arose out of product liability cases in which allegedly defective products were destroyed and no longer available for inspection. Cerando v. Com., Department of Transportation, Bureau of Driver Licensing, 725 A.2d 1271, 1272 (Pa. Cmwlth. 1999).

12. In determining whether grounds exist for drawing an adverse inference against Knorr for allegedly failing to produce relevant evidence in this case, the Board must consider: (1) the degree of fault of the party that altered or destroyed the evidence; (2) the degree of prejudice suffered by the opposing party; and (3) the availability of a lesser sanction that will protect opposing party's rights and deter future similar conduct. See Schroeder v. Department of Transportation, 710 A.2d 23, 27 (Pa. 1998); Oxford Presbyterian Church v. Weil-McLain Co., 815 A.2d 1094, 1104 (Pa. Super. 2003); Morder v. Professional Aerials, 3 Pa. D.&C.5th 318 (Pa. Com. Pl. 2006), 2006 WL 5820609. Id.

13. Because PennDOT had access to information regarding the SR28 project through field inspection diaries kept by PennDOT employees, the Board concludes that PennDOT was not prejudiced in the presentation of its defenses against Knorr's claims. Id.

14. Because PennDOT has failed to produce sufficient evidence showing that Knorr withheld or destroyed relevant evidence in this case, it has not established a basis to apply the spoliation doctrine or to justify negative inferences as to information contained in the documents complained of by PennDOT. Id.; See also Koken, 885 A.2d at 1100 n.7; Cerando 725 A.2d at 1272.

15. Persons are generally considered competent to testify unless he or she is found to have some type of mental disability affecting the ability to perceive or express themselves adequately or impairing memory or ability to perceive a duty to tell the truth. Pa. R.E. 601.

16. PennDOT's objection that Mr. Knorr was generally incompetent to testify on those issues which he addressed is wholly without merit as the Board found no evidence whatsoever that Mr. Knorr was mentally disabled or that his ability to perceive, remember or testify was impaired in any way. PennDOT's concerns regarding the degree of Mr. Knorr's knowledge of the events about which he testified and the number of days he was present on the project go to the weight the Board should give to his testimony, not to Mr. Knorr's competence as a witness. Id.

17. PennDOT's objections to Mr. Knorr's competency are ineffective to raise issues of hearsay or other evidentiary matters. Objections to evidence, be it testimonial or documentary, must be both timely and specific. Pa. R.E. 103(a)(1); See e.g., Jones v. Spidle, 286 A.2d 366, 367-68 (Pa. 1971); Folger ex rel. Folger v. Dugan, 876 A.2d 1049, 1055 (Pa. Super. 2005); Commonwealth v. Pearson, 685 A.2d 551, 555 (Pa. Super. 1996); Stulz v. Boswell. 453 A.2d 1006, 1010 (Pa. Super. 1982); Burton-Lister v. Siegel, Sivitz & Lebed Associates, 798 A.2d 231, 239-40 (Pa. Super. 2002).

18. The Board is the finder of fact in this case, charged with the duty of determining the credibility of evidence and resolving conflicting testimony. The Board's findings need not be supported by uncontradicted evidence, so long as they are supported by substantial evidence. Department of General Services v. Pittsburgh Building Co., 920 A.2d 973, 989 (Pa. Cmwlth. 2007).

19. The Board is the ultimate finder of fact and is charged with determining the credibility and persuasiveness of witness testimony, including that of expert witness testimony. James Corp. v. North Allegheny School District, 938 A.2d 474, 495 n.21 (Pa. Cmwlth. 2007).

20. The Board has wide discretion in determining when to allow expert testimony, and its judgment is final in the absence of a clear abuse of discretion. Daddona v. Thind, 891 A.2d 786, 805 (Pa. Cmwlth. 2006).

21. Rebuttal evidence is proper when it offers facts to discredit the other party's witness. Mitchell v. Gravely International, Inc., 698 A.2d 618, 620 (Pa. Super. 1997).

22. Rebuttal evidence is permissible even when it falls outside the scope of an expert's pre-trial report, and when a party offers certain evidence in its case-in-chief, it cannot later deny the opposing party the opportunity to deny the evidence. Daddona, 891 A.2d at 805; Foflygen v. Allegheny General Hospital, 723 A.2d 705, 709-10 (Pa. Super. 1999).

23. Rule 4003.5 of the Rules of Civil Procedure, cited by PennDOT to support its argument that Mr. Rhodes' rebuttal testimony was inadmissible because it went beyond the scope of his expert report does not exclude those opinions intended to rebut testimony by the other party's expert. Pa.R.C.P. No. 4003.5(c) and cmt. 6.

24. Because Knorr offered the rebuttal testimony of Mr. Rhodes in order to discredit points made during the testimony of PennDOT's experts, Mr. Eberhardt and Mr. Malengo, the Board had the discretion to allow Mr. Rhodes' rebuttal testimony. Flowers v. Green, 218 A.2d 219, 220 (Pa. 1966); Mitchell v. Gravely International, 698 A.2d 618, 620 (Pa. Super. 1997).

25. Section 1712.1(b) of the Commonwealth Procurement Code, 62 Pa.C.S.A. § 1712.1(b), states that a claim shall be filed within six months of the date it accrues.

26. A claim accrues when: (1) a claimant is first able to litigate his claim. i.e., when the amount due is known and the claimant is able to prepare a concise statement of the claim; and (2) the claimant is affirmatively notified that he will not be paid by the Commonwealth agency. Darien Capital Management, Inc. v. Com., Public School Employes' Retirement System, 549 Pa. 1, 6, 700 A.2d 395, 397 (1997).

27. Knorr's claims against PennDOT on the SR28 project did not accrue on (A) December 29, 2000 (Knorr's letter to PennDOT advising that it was just beginning to evaluate its additional costs), (B) the January 29, 20001 meeting that followed (to discuss Knorrs "concerns" and "begin working toward a common vision of results") or (C) the PennDOT letter of May 17, 2001 (PennDOT's summary of the discussion on January 29 indicating PennDOT required additional information on nearly all issues discussed) because, inter alia: (1) these three points of communication indicate an ongoing series of discussions regarding extra costs/work incurred by

Knorr and the appropriate allocation of responsibility for same; (2) work was still continuing on the SR28 project; (3) the evidence does not establish that Knorr could then identify the amount due for (or the extent of) its claims or that PennDOT itself had made a final determination as to what, if any, adjustments it would make to the Contract amount in response to this initial discussion. Accordingly, these interim actions do not constitute the "accrual" of Knorr's claims as set forth in Darien. Id.

28. PennDOT's Notice of Final Quantities and Contract Settlement Amount, dated February 3, 2003, constituted the final statement of what PennDOT would pay for the SR28 project. Pursuant to the evidence presented in this case, it is upon this date that Knorr's claims against PennDOT on the SR28 project accrued. Id.

29. Knorr's claim in the form of a Request for Equitable Adjustment submitted to PennDOT through the District Engineer for the project on July 25, 2003, was filed within the six-month statute of limitations set forth in Section 1712.1(b) of the Commonwealth Procurement Code and satisfied the filing requirements of Section 1712.1(a), (b) and (c). Id.; 62 Pa. C.S. § 1712.1.

30. Section 1712.1(d) of the Commonwealth Procurement Code states that a contracting officer [with the agency] shall review a claim within 120 days of its submission, but if the officer fails to issue a determination within that time, the claim shall be deemed denied. 62 Pa. C.S. § 1712.1(d).

31. Section 1712.1(e) of the Commonwealth Procurement Code provides that a contractor may file its claim with the Board within 15 days of the mailing date of a final determination by the contracting officer or within 135 days of filing its claim [with the agency] whichever occurs first. 62 Pa. C.S. § 1712.1(e).

32. Because PennDOT did not respond to Knorr's claim to PennDOT filed on July 25, 2003, Knorr's claim with the Board, filed on December 5, 2003, was filed within the 135 day statutory limit contained in Section 1712.1(e) of the Commonwealth Procurement Code. Thus Knorr's claim at the Board was filed timely and in compliance with Section 1712.1 of the Commonwealth Procurement Code. 62 Pa. C.S. § 1712.1.

33. A statute-of-limitations defense is an affirmative defense and is only properly raised in new matter in the answer to a complaint. Pa.R.C.P. No. 1030; Miller v. Klink, 871 A.2d 331, 333 n.4. (Pa. Cmwlth. 2005).

34. Recitation of the following words in paragraph 84 of PennDOT's new matter is insufficient to preserve a statute of limitations argument: "The above facts provide for multiple affirmative defenses, including, inter alia, accord and satisfaction, estoppel, laches, statute of limitations, and/or waiver and payment." The foregoing words fail to identify the material facts for PennDOT's alleged statute of limitations argument. Accordingly, PennDOT has failed to adequately plead a statute of limitations defense in its new matter to Knorr's complaint. See Pa. R.C.P. 1019(a) and 1030. See also, Com., Pennsylvania Public Utility Commission v. Zanella Transit, Inc., 417 A.2d 860, 861 (Pa. Cmwlth. 1980) (defendant must aver material facts in answer and new matter that traverse allegations made in claim); Allen v. Lipson, 8 Pa. D&C.4th

390, 393-94 (Pa. Com. Pl. 1990) 1990 WL 313425 at *2 (noting that defendant must plead material facts in new matter upon which defense is based).

35. PennDOT waived any statute of limitations affirmative defense by failing to adequately raise the defense in its answer and new matter to Knorr's complaint. Pa. R.C.P. 1030, 1032; Werner v. Werner, 573 A.2d 1119, 1121 (Pa. Super. 1990).

36. Section 102.05 of the 408 Specifications states that the "Department's plans and specifications are complete and are prepared so any competent contractor is able to complete the proposed work." (408 Specifications Section 105.05; Plaintiff's Exhibit 1).

37. The drawings and plans provided by PennDOT to Knorr for the SR28 project were design specifications. Accordingly, PennDOT warranted that those drawings and plans were adequate to allow Knorr to complete the work on the SR28 project in a satisfactory manner. A.G. Cullen Constr., Inc. v. State System of Higher Education, 898 A.2d 1145, 1156-1160 (Pa. Cmwlth. 2006) (discussing difference between "design" and "performance" specifications and confirming owner's responsibility for the former under Pennsylvania law). See also, United States v. Spearin, 248 U.S. 132, 137-39 S. Ct. 59 (1918); Canuso v. City of Philadelphia, 192 A. 133, 136 (Pa. 1937); Com., Department of Transportation v. W.P. Dickerson & Son, Inc., 400 A.2d 930, 932 (Pa. Cmwlth. 1979); Allentown Supply Corp. v. Stryer, 195 A.2d 274, 279 (Pa. Super. 1963); Angelo Iafrate Const. Co., Inc. v. Pennsylvania Turnpike Commission, 2006 WL 2585020, pp. 29-30, 41-42 (Pa. Bd. Claims 2006) (affirmed by Commonwealth Court in unreported opinion).

38. PennDOT had a contractual obligation to provide Knorr with drawings and plans for the SR28 project that were adequate to allow Knorr to complete the work on the project in a satisfactory manner. Id. See also, 408 Specifications 102.05; Plaintiff's Exhibit 1.

39. When PennDOT instituted changes or modifications to the design specifications for the project (either of its own accord or to address inadequacies or problems encountered on the project) PennDOT had a contractual obligation to provide such changes and/or modifications in a prompt and timely manner so as not to impede the progress of work on the project. A.G. Cullen Constr., Inc. v. State System of Higher Education, 898 A.2d 1145, 1156, 1160 (Pa. Cmwlth. 2006) (in addition to discussing the difference between design and performance specifications the Commonwealth Court also noted that the government has a duty not to act in a way to hinder or delay a contractor's performance with regard to such design specifications). See also, United States v. Spearin, 248 U.S. 132 at 137-139; Canuso v. City of Philadelphia, 192 A. 133 at 136; Com., Department of Transportation v. W.P. Dickerson & Son, Inc., 400 A.2d 930 at 932; Allentown Supply Corp. v. Stryer, 195 A.2d 274 at 279 ; Angelo Iafrate Const. Co., Inc. v. Pennsylvania Turnpike Commission, 2006 WL 2585020 at pp. 29-30, 41-42.

40. The Board is capable of determining if the plans, drawings and specifications for the project provided by PennDOT were adequate to build the project and if any changes or revisions thereto were provided in a timely manner so as not to impede Knorr's work on the project without the need of expert testimony from an engineer or architect as to "design defects." Id.

41. Insistence by an owner that a contractor begin or continue working on a project while failing to provide the contractor with design specifications adequate to perform such work constitutes not only a breach of contract by the owner but also constitutes active interference with the contractor's work. See e.g., Coatesville Contractors & Engineers, Inc. v. Borough of Ridley Park, 506 A.2d 862, 865-867 (Pa. 1986); Department of General Services v. Pittsburgh Building Company, 920 A.2d 973, 987 (Pa. Cmwlth. 2007) (active interference occurs where there is: (1) an affirmative or positive interference by the owner with the contractor's work or (2) there is a failure on the part of the owner to act in some essential matter necessary to the prosecution of the work).

42. The doctrine of active interference prohibits a party from raising the exculpatory provisions in a contract as a defense if: (1) there is affirmative or positive interference by the owner with the contractor's work or; (2) there is a failure on the part of the owner to act in some essential matter necessary to the prosecution of the work. Id.

43. By failing to supply Knorr with necessary roadway grades/elevations for several portions of roadway in a timely manner as noted in Findings of Fact 86-98; failing to provide plans (i.e. design specifications) adequate to construct the roadway; failing to take steps necessary to progress the project in a timely manner and actively interfering with Knorr's sub-base and paving operations, PennDOT materially breached its contract with Knorr and actively interfered with Knorr's contract work on the SR28 project. (See Conclusions of Law, ¶¶ 36-42).

44. By failing to timely address the slope instability and the slope repair problems as noted in Findings of Fact 99-128; failing to provide plans and direction regarding design specifications adequate to construct the slope cut along the roadway; failing to take steps necessary to progress the project in a timely manner and actively interfering with Knorr's sub-base and paving operations around the slope area, PennDOT materially breached its contract with Knorr and actively interfered with Knorr's contract work on the SR28 project. (See Conclusions of Law, ¶¶ 36-42).

45. By changing the original plans for roadway shoulder renovation between Stations 1820 to 1844, and then failing to timely provide direction and/or plan revisions adequate to construct the changes to the roadway shoulder work, as noted in Findings of Fact 151-168; failing to provide plans and directions regarding design specifications adequate to construct the roadway shoulders (as modified) in a timely manner; failing to take steps necessary to progress the project in a timely manner and actively interfering with Knorr's shoulder renovation work on the project between Stations 1820 to 1840, PennDOT materially breached its contract with Knorr and actively interfered with Knorr's contract work on the SR28 project. (See Conclusions of Law, ¶¶ 36-42).

46. By failing to supply Knorr with the necessary roadway grades/elevations for the roadway around the box culvert area as noted in Findings of Fact 177-207; failing to provide plans (i.e. design specifications) adequate to construct the roadway; failing to take steps necessary to progress the project in a timely manner and actively interfering with Knorr's sub-base and paving operations around the box culvert, PennDOT materially breached its contract with Knorr and actively interfered with Knorr's contract work on the SR28 project. (See Conclusions of Law, ¶¶ 36-42).

47. Section 111.02 of the 408 Specifications, limiting recovery of home office overhead to 10% of extra labor, material and equipment costs, is inapplicable to this case, because the Board has adopted the mark-up rates set forth in Section 110.03(d)(7) of the 408 Specifications. (408 Specifications Sections 110.03 and 111.02).

48. Exculpatory clauses similar to the one in Sections 110.03(a) and 111.02 are not enforceable if there is active interference by the owner (i.e. positive interference with the contractor's work by the owner, or a failure on the part of the owner to act in some manner necessary to the prosecution of the work). A.G. Cullen Constr., Inc. v. State System of Higher Education, 898 A.2d 1145, 1175-76 (Pa. Cmwlth. 2006); Department of General Services v. Pittsburgh Building Co., 920 A.2d 973, 987 (Pa. Cmwlth. 2007); Coatesville Contractors & Engineers, Inc. v. Borough of Ridley Park, 506 A.2d 862, 865 (Pa. 1986); Gasparini Excavating Co. v. Pennsylvania Turnpike Commission, 187 A.2d 157, 161-62 (Pa. 1963).

49. Because PennDOT's acts and omissions on the SR28 project actively interfered with Knorr's prosecution of its planned work, PennDOT cannot invoke Sections 110.03(a), 111.02 or other exculpatory provisions in the Contract as general defenses against Knorr's claims. Id.

50. Section 106.03(a)(1) of the 408 Specifications states that PennDOT will be responsible for the acceptability of materials used for construction and for all acceptance testing. (408 Specifications Section 106.03).

51. PennDOT's suspension of OGS supply from Grange Lime & Stone, on March 16, 2000, appears to be consistent with the Contract specifications, and Knorr has not established that the initial suspension was improper. (408 Specifications Section 106.03).

52. Although the above cited provision at Section 106.03(a)(1) may be read to impose a duty on PennDOT to conduct and report acceptability testing in a reasonable manner, this provision also states clearly that the Contractor (Knorr) remains responsible for the control and quality of materials used throughout construction. Section 106.02 also makes it clear that preliminary testing in no way guarantees continued acceptance of the material and it remains the contractor's ongoing responsibility to furnish materials from other acceptable sources if materials from original sources no longer comply with requirements. (408 Specifications Sections 106.02 and 106.03).

53. Because, inter alia, Knorr itself had an ongoing duty to control and assure the quality of the material it used for construction on the SR28 project; a preliminary testing did not guarantee the ongoing availability of a particular source; Knorr had a duty to obtain materials from acceptable sources; and Knorr utilized a different and acceptable source of OGS when it needed same and failed to establish any material damage as a result of same, we find that PennDOT's failure to timely re-test the Grange OGS or report the results of same to Knorr was not a material breach of contract with Knorr. See also, Lane Enterprises, Inc. v. L.B. Foster, Co., 700 A.2d at 471. (408 Specifications Sections 106.02 and 106.03).

54. Because the additional excavation of 672 cubic yards performed by Knorr in connection with the revised full-depth widening of the roadway shoulders on this project from Stations 1820 to 1834 involved sawcutting or milling of the roadway in order to facilitate

connecting the joint between the old and new pavement; the Board has found that the excavation at issue was more akin to the rehabilitation of the roadway shoulder as described by Class 1B excavation, as opposed to the bulk excavation of Class 1; and operative plan excerpts cited by PennDOT in support of its Class 1 characterization for this work are ambiguous at best, we find that PennDOT is liable to Knorr for $24,202 in additional compensation for Knorr's excavation of the 672 cubic yards here at issue. (408 Specificatons § 203.1; See, Jay Twp. Authority v. Cummins, 773 A.2d 828, 832 n.3 (Pa. Cmwlth. 1998); See also, Pittsburgh Building Co., 920 A.2d at 989.

55. Section 110.08(a) of the 408 Specifications, relating to the final inspection, states only that the parties to a contract "make arrangements for a mutual final inspection."

56. PennDOT did not have a contractual duty to schedule the final inspection of the SR28 project within a specified time limit. 408 Specifications § 110.08.

57. PennDOT did not breach the Contract by failing to conduct a final inspection between November 8, 2000, and December 7, 2000, because Knorr did not object to the December 7 date and the Contract sets forth no specific time limit within which a final inspection must occur. Id.

58. PennDOT is not liable for 29 days of impact on Knorr's construction efforts because of its scheduling of the semi-final inspection. Id.

59. Damages need not be determined with mathematical certainty, but only with reasonable certainty. Evidence of damages may consist of probabilities and inferences. Sufficient facts must be introduced to allow a court to arrive at an intelligent estimate without conjecture. A.G. Cullen Constr., Inc. v. State System of Higher Education, 898 A.2d 1145, 1174 (Pa. Cmwlth. 2006); J.W.S. Delavau, Inc. v. Eastern America Transport & Warehousing, Inc., 810 A.2d 672, 685 (Pa. Super. 2002).

60. If a contractor has suffered financial injury, a government agency should not be exonerated merely because the contractor cannot prove his increased costs with precision. John F. Harkins Co. v. School District of Philadelphia, 313 Pa. Super. 425, 460 A.2d 260 (1983). See also, A.G. Cullen Constr., Inc. v. State System of Higher Education, 898 A.2d 1145, 1174 (Pa. Cmwlth. 2006); J.W.S. Delavau, Inc. v. Eastern America Transport & Warehousing, Inc., 810 A.2d 672, 685 (Pa. Super. 2002).

61. If a contractor has suffered financial injury, a government agency should not be exonerated merely because the contractor cannot prove his increased costs with precision. John F. Harkins Co. v. School District of Philadelphia, 313 Pa. Super. 425, 460 A.2d 260 (1983). See also, . A.G. Cullen Constr., Inc. v. State System of Higher Education, 898 A.2d 1145, 1174 (Pa. Cmwlth. 2006); J.W.S. Delavau, Inc. v. Eastern America Transport & Warehousing, Inc., 810 A.2d 672, 685 (Pa. Super. 2002).

62. Because the Board has determined that Knorr was both delayed and disrupted in its work on the SR28 project by the five problems complained of by Knorr and found by the Board to constitute material breaches of contract and active interference by PennDOT with Knorr's work on the SR28 project (as summarized above in Findings of Fact 222-231, 249-251

and Conclusions of Law ¶43-46 and by Knorr's own self-inflicted problems as summarized above in Findings of Fact 221) it is appropriate that the Board seek to apportion responsibility for the actual delay and disruption damages experienced by Knorr on this project in accordance with the contribution each of these problems had to causing such delay and disruption damages. Id. Accordingly, based on the totality of the evidence and the Board's factual findings, PennDOT is solely responsible for 5/6 (83%) and Knorr itself is responsible for 1/6 (17%) of the delay and disruption damages the Board finds attributable to the parties and actually incurred by Knorr on the project. Id. See also, A.G. Cullen, 898 A.2d at 1160-1164.

63. PennDOT is liable to Knorr for $168,519 in total delay-related damages for the SR28 project. (See Conclusions of Law ¶43-46, 54, 59-62).

64. PennDOT is liable to Knorr for $232,462 in disruption-related damages for the SR28 project. (See Conclusions of Law ¶43-46, 54, 59-62).

65. PennDOT is liable to Knorr for additional work damages in the amount of $24,202 for the SR28 project. (See Conclusions of Law ¶43-46, 54, 59-62).

66. PennDOT is liable to Knorr for total damages in the amount of $425,183 for the SR28 project. (See Conclusions of Law ¶43-46, 54, 59-65).

67. Section 108.07(a) of the 408 Specifications is not inherently a penalty provision. Com., Department of Transportation v. Interstate Contractors Supply Co., 130 Pa. Super. 334, 568 A.2d 294, 295-96 (1990).

68. The party assessing liquidated damages has the ultimate burden of persuasion and the burden of initially showing that the contract was not completed by the agreed date and that liquidated damages were properly assessed. PCL Construction Services, Inc. v. United States, 53 Fed. Cl. 479, 484 (2002).

69. The party may meet this burden by showing that the contract performance requirements were not substantially completed by the contract completion date and that the period for which the assessment was made was proper. Id.

70. Under Pennsylvania law, a liquidated damages provision is not enforceable if it is punitive in nature, as opposed to compensatory. Hanrahan v. Audubon Builders, Inc., 614 A.2d 748, 750 (Pa. Super. 1992).

71. Damages for breach by either party may be liquidated in the agreement only at an amount that is reasonable in the light of the anticipated or actual loss caused by the breach and the difficulties of proof of loss. A term fixing unreasonably large liquidated damages is unenforceable on grounds of public policy as a penalty. A.G. Cullen Constr., Inc. v. State System of Higher Education, 898 A.2d 1145, 1162 (Pa. Cmwlth. 2006) (quoting Restatement (Second) of Contracts § 356(1) (1981)).

72. In determining whether a liquidated damages clause is an unenforceable penalty, one must examine the entire contract, the parties' intentions and the facility of measuring damages or lack thereof, so as to arrive at an equitable conclusion. Com., Department of Transportation v. Interstate Contractors Supply Co., 130 Pa. Cmwlth. 334, 568 A.2d 294, 295 (1990).

73. In determining the reasonableness of a liquidated damages assessment, it is also appropriate to look at the purpose of the liquidated damages provision to determine what cost it is intended to approximate. Id.

74. Construction engineering liquidated damages are intended to offset the cost to PennDOT to have site inspectors and personnel on an active job site while work is being performed after the anticipated completion of the contract work. (408 Specifications Section 108.07).

75. Utilizing the construction engineering liquidated damages provision in the 408 Specification to impose the per day liquidated damage amount for days spent doing force account (extra work outside the Contract); days when PennDOT agreed that no work would be performed; and for days spent doing contract work because of delay caused by PennDOT constitute inappropriate, non-compensatory (i.e. punitive) assessment of liquidated damages for such days. (408 Specifications Section 108.07; See also, A.G. Cullen, 898 A.2d at 1161-1163).

76. Because we have found that Knorr was responsible for only 15 days of delay prior to substantial completion of the project on December 7, 2000, and by agreement between itself and PennDOT entered into a second Winter Shutdown thereby working only 32 days from substantial completion until the final physical act of work on August 8, 2001; and because 13 of those additional 32 days worked subsequent to substantial completion were spent performing force account (i.e. work outside the Contract); and because, of the remaining 19 days of contract work after substantial completion, 16 were caused by PennDOT, we find that only 18 days of work beyond the contract completion date (i.e. 17 + 3) are properly assessed construction engineering liquidated damages pursuant to Section 108.07 of the 408 Specifications. Id.

77. The $194,350 requested by PennDOT as construction engineering liquidated damages is an unreasonably large and punitive liquidated damages figure under the circumstances of this case and therefore is unenforceable. Id.

78. Knorr is liable to PennDOT for $11,700 in construction engineering liquidated damages. Id.

79. Because we find PennDOT to be liable to Knorr on Knorr's claims' in this case in the total amount of $425,183, and we find Knorr to be liable to PennDOT on its counterclaim in the amount of $11,700, the Board will offset same. PennDOT is, after appropriate offset of its counterclaim award, liable to Knorr for damages (without interest) in the amount of $413,483.

80. Prejudgment interest is payable at the statutory rate for judgments (6% per annum) beginning on July 25, 2003, the date on which Knorr presented its claim to PennDOT, and running through the date of this Opinion and Order. 41 P.S. § 202 (legal rate of interest); Section 1751 of the Commonwealth Procurement Code, 62 Pa.C.S. § 1751.

81. The 6% per annum statutory rate of interest for judgments is appropriately applied from July 25, 2003, to the date of this Order to $413,483, resulting in prejudgment interest of $124,045 due on the principal damage amount.

82. PennDOT is liable to Knorr for a total judgment, including prejudgment interest, of $537,528.

83. DGS is liable for post-judgment interest on the total outstanding judgment at the statutory rate for judgments (6% per annum), calculated in the manner described for prejudgment interest, beginning on the date of the attached Opinion and Order and continuing until the date the judgment is paid in full. 62 Pa.C.S. § 1751; 41 P.S. § 202.

84. Neither attorneys fees nor penalty interest may be awarded to a party pursuant to Procurement Code provisions unless the acts/omissions of the other are found to be arbitrary or vexatious. 62 Pa.C.S. § 3935.

85. It is within this Board's discretion to award costs to a party litigant (other than attorneys fees). 62 Pa.C.S. § 1725.

OPINION

Plaintiff Wayne Knorr, Inc. ("Knorr"), brings this claim against Defendant Commonwealth of Pennsylvania, Department of Transportation ("PennDOT"), seeking $825,273 plus interest thereon, for alleged acts and omissions on the part of PennDOT that Knorr asserts caused it to incur delay and loss-of-productivity damages. Knorr claims these damages were incurred during the renovation and expansion of a two-mile section of State Road 28, located in Armstrong County between the boroughs of Distant and South Bethlehem. Knorr performed this work pursuant to Contract No. 101131 ("Contract"), executed by PennDOT on August 3, 1999, for a bid value of $3,963,884.40.

The SR28 project involved the expansion and renovation of 2.033 miles of roadway between Station 1776+49 and Station 1883+80. The major Contract work was to be the construction of a truck-climbing lane of approximately 1.12 miles in length between Stations 1780 and 1839. The area of the roadway to be widened for the truck-climbing lane was located primarily on the side of the project adjacent to the uphill, southbound travel lane, but it also included a portion of the downhill, northbound travel lane between Stations 1780 and 1813. Along the northbound travel lane, on the opposite side of the truck-climbing lane between Stations 1820 and 1844, the Contract plans also called for the renovation and widening of the roadway shoulder. In addition, Knorr was to demolish an old bridge and install a new bridge structure consisting of pre-cast concrete box culvert sections. These sections were to be installed in two phases so as to allow Knorr to maintain one lane of traffic through the area at all times. Finally, the Contract required Knorr to mill and repave the roadway and install curbs, gutters and signs in various locations.

PennDOT issued its Notice to Proceed on August 12, 1999. Since the Contract then required the contractor to complete the project within 368 calendar days, the contract completion

date became August 13, 2000.[10] However, because of various delays and disruptions, Knorr did not request the final inspection for the project until November 8, 2000. That inspection, representing the substantial completion of the project, was held on December 7, 2000, or 116 days past the original contract completion date. Knorr continued to perform a small amount of contract and force-account work intermittently until August 2001.

For the first several months of the project, construction appears to have proceeded in a more or less normal fashion. Knorr first performed the bulk excavation and the installation of additional drainage systems necessary to construct the truck-climbing lane. Having largely completed the bulk excavation and drainage work by sometime in December 1999, Knorr shut down almost all work on the project as of December 15, 1999 in order to recommence work during the warmer weather that would arrive in the Spring of 2000.[11] Knorr did, however, postpone the installation of the new box culvert bridge from the Fall and Winter of 1999 (as originally scheduled) until the Spring of 2000. Knorr re-mobilized its work force on or about March 6, 2000, and shortly thereafter had completed preparations for the commencement of sub-base and paving work on the roadway.

Knorr alleges that PennDOT committed a series of acts and omissions that delayed and disrupted Knorr's work on the project from March 2000, which resulted in Knorr incurring increased and unanticipated costs for which it now requests damages. Specifically, Knorr asserts that: (1) PennDOT supplied Knorr with inadequate and outdated Contract drawings that showed incorrect or missing roadway grades/elevations throughout the project; (2) PennDOT delayed and disrupted work on the sub-base and paving of the truck-climbing lane by failing to timely

[10] The bid documents initially contemplated the issuance of a Notice to Proceed by August 2, 1999, but this was delayed until August 12, 1999. Neither party contests the propriety of the corresponding 10 day extension of the project completion date to August 13, 2000, and Knorr does not claim delay costs for this 10 day period.

[11] This "Winter Shutdown" implemented by Knorr roughly corresponded to PennDOT's standard seasonal prohibition against Winter paving found in the applicable specifications contained in Publication 408 running generally from October 31 to April 1 (unless otherwise permitted in writing by the District Engineer). Section 401.3, Publication 408 (1994).

address slope failure and instability in excavated areas adjacent to the truck-climbing lane; (3) PennDOT suspended delivery of OGS (a sub-base material) from Knorr's chosen supplier pending PennDOT's plant verification testing, then failed to timely conduct the testing and/or to report the results of the testing to Knorr; (4) PennDOT made significant changes to the design of the roadway shoulder from Stations 1820 to 1844, and then failed to timely supply Knorr with the specifics needed to implement these changes; (5) PennDOT supplied inaccurate grades and elevations for an area surrounding the box culvert bridge and then failed to timely supply the corrected grades/elevations; and (6) PennDOT failed to timely schedule the project's semi-final inspection, thus delaying Knorr's demobilization of equipment and manpower at the end of the project. In totality, Knorr asserts that the foregoing six factors substantially delayed Knorr's sub-base and paving work that it had contemplated commencing in the early Spring of 2000, and caused Knorr to incur additional loss-of-productivity costs because it was forced to move men and equipment from place to place along the roadway and work in a disjointed manner rather than in a linear and continuous manner as Knorr anticipated when it submitted its bid.

PennDOT disputes Knorr's assertions of owner-caused delay and disruptions in regard to the foregoing six factors, and also makes a number of additional defensive arguments that PennDOT asserts require the Board to deny Knorr's claim in its entirety. Specifically, PennDOT preliminarily argues that: (1) Knorr initially breached its Contract with PennDOT by failing to supply a "critical path method" ("CPM") schedule that would show how and when Knorr planned to complete work on the project; (2) the evidence presented by Knorr at the trial was insufficient to constitute the substantial evidence necessary to support any ultimate factual finding in support of Knorr's damages claim (including accusations of spoliation of evidence because of missing documents and other circumstances requiring adverse inferences against Knorr and assertions of incompetent expert testimony); (3) Knorr's claim for damages should be

limited or wholly denied because of limiting language in the applicable 408 Specifications[12]; and (4) Knorr failed to file this claim with the Board within the applicable statute of limitations. In the nature of a counterclaim, PennDOT also asserts that, because of Knorr's failure to complete all physical work on the project until August 8, 2001, PennDOT is entitled to assess construction engineering liquidated damages in excess of $190,000.

PennDOT's Argument Regarding Knorr's Failure to Supply a Detailed CPM Project Schedule

PennDOT first argues that Knorr breached its contract duties to PennDOT by failing to provide a CPM schedule for the project. PennDOT asserts that, near the beginning of the project, Knorr agreed to supply a CPM schedule which could be used by PennDOT to monitor Knorr's work and to document any project delays. PennDOT further asserts that Knorr stated it would submit a CPM schedule and that this representation was recorded in a memorandum drafted by Assistant Construction Engineer Sarah Cunningham; that Mr. Knorr met with a PennDOT representative regarding the CPM schedule; that Mr. Knorr's diary showed that PennDOT requested a schedule; and that PennDOT's written evaluation of Knorr's work, completed after the project, stated that the lack of such a schedule resulted in a significant loss of productivity.

The Board does not find PennDOT's arguments to be persuasive on this point. First of all, PennDOT included in its bid package a form "D-476 Distribution of Contract Time" which, in fact, became the schedule for the Contract by default. Section 108.03 of the applicable 408 Specifications, relating to performance and progress on a construction project, provides, in relevant part:

> If the [contractor supplied] schedule is accepted without change in writing by the Chief Engineer, Highway Administration, it will be considered the official

[12] The contract for the project (Contract 101131 dated August 3, 1999) specifically references the Publication 408 Specification dated 1994. See also Plaintiff's Exhibit 12 (admitted without objection).

> schedule for all purposes, including, but not limited to, the calculation of liquidated damages and the computation of time used in proving all claims filed with the Board of Claims. If the schedule is not accepted in writing or if no schedule is presented for approval at the preconstruction meeting, the schedule contained in the contract will be the official schedule for all purposes, as stated above.

(Plaintiff's Exhibit 12).

Second, even though a PennDOT memorandum of the July 30, 1999 pre-construction meeting indicated that a CPM schedule "will be submitted" by Knorr, this representation was soon contradicted by a letter dated August 9, 1999 signed by John Fry (the Engineering District 10-0 Assistant Engineer for Construction) on behalf of Richard Hogg (the supervising District Engineer for Engineering District 10-0). In this letter notifying Knorr that it could proceed with construction as of August 12, 1999, Mr. Fry stated: "During a conference held in the District Office in Indiana on July 30, 1999, you outlined your method of procedure and agreed that it will be carried on in accordance with our Schedule of Operations on Form 476 furnished you." (Plaintiff's Exhibit 120). Third, both John Fry and Sarah Cunningham (PennDOT's assistant construction engineer on the project) testified that Knorr had a right to use the Form D-476 schedule as the official schedule of the project. The Board also notes that it is not uncommon for contractors to use the D-476 as the schedule on PennDOT projects. In light of the foregoing, as well as the absence of any writing subsequent to the August 9, 1999 letter specifically requesting a CPM schedule, we find PennDOT's argument that Knorr breached its contract by failing to supply a CPM schedule to be without merit.

Even if it is assumed that Knorr's failure to supply a CPM schedule was a breach of contract, because the D-476 schedule existed and was accepted by the PennDOT personnel in charge of the project, we find that the failure to submit a CPM schedule was not a material breach of the contract. If, indeed, the lack of a CPM schedule was of material importance to PennDOT at the time, we would expect, at the least, that PennDOT would have reduced its

concern to writing and demanded such a schedule by a date-certain early in the project. This clearly did not occur. Instead, Knorr's use of the D-476 schedule was accepted by PennDOT project personnel in accordance with the Contract's specifications. In summary, although it may have been to Knorr's advantage to produce a CPM schedule more detailed than the D-476 schedule provided by PennDOT, the fact that Knorr failed to produce such a schedule was not, in the Board's view, a material breach nor factor in explaining the problems experienced or the claims made on the project.

PennDOT's Arguments Regarding Knorr's Evidence

As a second preliminary matter, PennDOT sets forth several arguments that the evidence presented by Knorr at the trial was fatally defective and that, for the reasons cited, the Board should either draw an adverse inference against Knorr or dismiss its claim entirely. PennDOT contends that: (1) the Board should either dismiss Knorr's claim or draw an adverse inference against Knorr because Knorr failed to produce certain employee diaries respecting the project; (2) Knorr's failure to present certain fact witnesses renders its claim unsupportable; and (3) PennDOT's expert witnesses are superior to Knorr's expert and the testimony of Knorr's witness cannot support Knorr's claims.

On the first point, PennDOT invokes the "spoliation doctrine," a rule of evidence which states that a party may not benefit from its own destruction or withholding of evidence. Koken v. Colonial Assurance Co., 885 A.2d 1078, 1100 n.7 (Pa. Cmwlth. 2005). This doctrine apparently arose out of product liability cases in which an allegedly defective product was destroyed and no longer available for inspection. Cerando v. Com., Department of Transportation, Bureau of Driver Licensing, 725 A.2d 1271, 1272 (Pa. Cmwlth. 1999). Here, PennDOT asserts that field diaries from Knorr employees Bill Reed, Joe Ambrose, Jim Hess, Ron Mroczka and John Barletta were not produced by Knorr, which instead relied heavily on

entries from the diaries that were produced by Mr. Knorr and Willie Confer in making its case. From this, PennDOT suggests that something is amiss in this pattern of documentary production, implies that Knorr negligently lost or deliberately destroyed field diaries that may have bolstered PennDOT's arguments in this case and asserts that the Board should, at very least, draw an adverse conclusion regarding what PennDOT regards as "selective production" of employee diaries.

The Board finds nothing in the evidentiary record to establish PennDOT's allegation that Knorr deliberately withheld or destroyed these diaries, or otherwise acted in bad faith in evidence production. See Koken, 885 A.2d at 1100 n.7 ("Because the Liquidator undertook a detailed and extensive search for the lost records but was unable to locate all of them and because Brown Schultz found no evidence of bad faith by the Liquidator, the doctrine of spoliation does not apply to this case."). Mr. Knorr testified that he did not withhold evidence, that he gave PennDOT access to all of the evidentiary documents in Knorr's possession regarding the SR28 project (contained in some 20 boxes) and that PennDOT made copies of all of the documents it considered relevant. Mr. Knorr also indicated that the individuals maintained their own work diaries not Knorr as a company and did not turn them in even though requested to do so. He further testified that Jim Hess changed employment sometime in 2000, that Joe Ambrose could not find his work diary, that Ron Mroczka was 71 years old and retired from work sometime in 2000, and that John Barletta worked on the SR28 project for only a few days. Although Knorr's methods of record-keeping fall well short of ideal, nothing produced by PennDOT establishes that Knorr, by failing to produce these diaries, acted in bad faith.[13] Moreover, PennDOT itself states that all of its employees on the project kept detailed diaries of

[13] PennDOT filed motions to compel the production of certain documents on March 10, 2006 and on June 3, 2006, but neither of those motions nor any other filed by PennDOT addressed any alleged failure to properly produce field inspection diaries.

the project's progress and problems. We note further that both parties have utilized the diaries of PennDOT's own employees extensively. These diaries presumably reflect the progress of the project from PennDOT's perspective and have allowed PennDOT to fashion an adequate defense to Knorr's claims. In short, PennDOT has not established a basis to invoke the spoilation doctrine or support adverse inference.

PennDOT also argues that Knorr's failure to call fact witnesses with a greater knowledge of the day-to-day activities on the project than it has is fatal to Knorr's claim. In particular, PennDOT emphasizes that Mr. Knorr was absent from the job site on many days, that Knorr failed to call any of its foremen who were at the job site on a daily basis (such as Mr. Ambrose or Mr. Reed) and that PennDOT employees such as Brian Heeter and David Schaffer (who were presented by PennDOT as witnesses at hearing) were on the job site on almost a daily basis. PennDOT then concludes from this that the evidence presented by Knorr cannot possibly provide adequate support for Knorr's damage claims.

The Board does not know why Knorr declined to call, for example, Dick Fisher, its surveyor, or Willie Confer, a project foreman. On the other hand, the Board is also unaware of why PennDOT failed, for example, to call Frank Welsh, listed in PennDOT's pre-trial statement as an individual who conducted material testing for CMT labs with regard to the OGS issue. We do know that several of Knorr's on-site people changed employment or retired. More importantly, we note that the credibility of a particular witness's testimony depends on more than simply counting the number of days during which he was present on a job site: Credibility will also depend on, inter alia, the specific facts of the case which the witness is called upon to present, his/her familiarity with these facts and issues, the articulation of the witness, the consistency or inconsistency of the testimony with other evidence and the manner in which the witness handles questioning on direct and cross examination. Here, PennDOT alleges a flaw in

Knorr's presentation which goes, at most, to the weight of the evidence and not to its competence. Mr. Knorr, despite his absences from the project, was found by the Board, when challenged by Defendant's counsel, to be competent to testify on the issues he addressed, and his testimony was supplemented, inter alia, by PennDOT's own field inspection diaries ("FID's"), other documents and factual testimony elicited on direct or cross examination from three other PennDOT witnesses (not all of which testimony was favorable to PennDOT).[14] Defendant's general complaint that Knorr failed to call a particular witness or a sufficient number or type of factual witnesses, at most, reflects on the weight to be given the testimony but is not, in and of itself, a reason to deny Knorr's claim.

PennDOT's final evidentiary point is that its expert witnesses, Mr. Eberhardt and Mr. Malengo, are superior in terms of qualifications and experience, and therefore their testimony should be given greater weight than the testimony of Mr. Rhodes, Knorr's expert witness. PennDOT also asserts that the portion of Mr. Rhodes testimony that we considered rebuttal testimony should be excluded and ignored by the Board because Knorr did not submit a rebuttal expert report before a pre-trial scheduling deadline.

Regarding Mr. Rhodes' credentials, he described his education and professional experience before commencing his direct testimony, and was admitted by the Board as an expert on the quantification of construction delays, disruptions and the resulting damages that Knorr allegedly accrued. In fact, Mr. Rhodes has testified before the Board on several occasions on the issues of construction delays and inefficiencies and the resulting damages, and we find him fully qualified to do so. Mr. Rhodes' testimony and opinions on Knorr's claims will be accepted or rejected by the Board on their merit, as will those of Mr. Eberhardt and Mr. Malengo. The

[14] PennDOT had ample opportunity to object to specific testimony including that of Mr. Knorr and other witnesses of the Plaintiff on the grounds of hearsay or other evidentiary rules. Despite a multitude of objections from Defendant's counsel, almost none were based on hearsay, and those objections made on the basis of competence were typically directed at explicating documents and the witness allowed to testify as to his/her own understanding of these documents only.

Board is, and remains, the ultimate finder of fact and is charged with determining the credibility and persuasiveness of witness testimony, including that of expert witnesses. James Corp. v. North Allegheny School District, 2007 WL4208589, at *18 n.21 (Pa. Cmwlth. 2007).

In regard to Mr. Rhodes' rebuttal testimony on March 30, 2007, the tenth and last day of the trial, the Board notes that a trial court has wide discretion in determining when to allow expert testimony, and that its judgment is final absent a clear abuse of discretion. Daddona v. Thind, 891 A.2d 786, 805 (Pa. Cmwlth. 2006). Rebuttal evidence is proper when it offers facts to discredit the other party's witness. Mitchell v. Gravely International, 698 A.2d 618, 620 (Pa. Super. 1997). When a party offers certain evidence in its case-in-chief, it cannot later deny the opposing party the opportunity to deny the evidence. Such rebuttal evidence is permissible even when it falls outside the scope of an expert's pre-trial report. Daddona, 891 A.2d at 805; see Foflygen v. Allegheny General Hospital, 723 A.2d 705, 709-10 (Pa. Super. 1999). The Board also notes that Rule 4003.5 of the Rules of Civil Procedure (cited by PennDOT) applies to opinions offered on direct examination and does not necessarily exclude those opinions intended to rebut testimony by the other party's expert. Id. at 813 ("Rebuttal evidence . . . [is] evidence given to explain, repel, counteract, or disprove facts . . . given in evidence by the adverse party."); See also, Pa.R.C.P. No. 4003.5(c) cmt. 6. The Board has reviewed Mr. Rhodes' rebuttal testimony and, because it addresses points made by Mr. Eberhardt and Mr. Malengo during PennDOT's case-in-chief, the Board is satisfied that it is fair rebuttal testimony.[15]

[15] At the beginning of the tenth and final day of testimony, PennDOT's attorney, Mr. Wilson, objected to Mr. Rhodes' being allowed to testify in rebuttal based on Rule 4003.5 of the Pennsylvania Rules of Civil Procedure before Mr. Rhodes began to testify, stating that the testimony would be beyond the scope of Mr. Rhodes' pre-trial report. The objection was noted and the Board directed Mr. Wilson that "if you believe he's going beyond his report, state your objection at that point in time." (N.T. 2084). Mr. Wilson did not thereafter raise a scope objection to any of Mr. Rhodes' subsequent testimony. We further note that PennDOT produced no evidence that Mr. Rhodes' rebuttal testimony ran contrary to any testimony he had previously proffered in discovery or otherwise.

PennDOT's Assertion that Knorr's Claim for Damages Should be Limited or Wholly Denied Because of Limiting Language in the 408 Specifications

PennDOT's third preliminary argument begins with the assertion that Knorr has already been fully compensated for much if not all of the claim it now asserts here as evidenced by the 61-day time extension granted to Knorr in PennDOT's letter of August 21, 2000. PennDOT asserts that Knorr has been fully compensated and paid by force account for 9 of the 11 items of work listed in the August 21, 2000 letter and that Knorr was paid for the other 2 items at "contract unit prices." PennDOT asserts that these methods of payment include markups for labor, equipment and materials, and thus fully compensated Knorr for the extra work associated with the problems for which the extension was granted. PennDOT also asserts that various provisions in the 408 Specifications otherwise limit the amount and/or types of damages that Knorr may claim. Because a cogent analysis of these arguments first requires a clear understanding of the claims asserted by Knorr, we will postpone resolution of this defensive argument asserted by PennDOT until after discussion of Knorr's claims in greater detail.

PennDOT's Statute of Limitations Defense

PennDOT's fourth and final preliminary argument is that Knorr failed to file its claim within the six-month statute of limitations as required by Section 1712.1 of the Commonwealth Procurement Code, 62 Pa.C.S.A. § 1712.1. Section 1712.1(b) and (d) state:

> **(b) Filing of claim.—**A claim shall be filed with the contracting officer within six months of the date it accrues. If a contractor fails to file a claim or files an untimely claim, the contractor is deemed to have waived its right to assert a claim in any forum. Untimely filed claims shall be disregarded by the contracting officer.
>
> . . . .
>
> **(d) Determination.—**The contracting officer shall review a claim and issue a final determination in writing regarding the claim within 120 days of the receipt of the claim unless extended by consent of the contracting officer and the contractor. If the contracting officer fails to issue a final determination within the 120 days unless extended by consent of the parties, the claim shall be deemed

> denied. The determination of the contracting officer shall be the final order of the purchasing agency.

A claim accrues when: (1) a claimant is first able to litigate his claim, i.e., when the amount due under the claim is known and the claimant is able to prepare a concise statement of the claim; and (2) the claimant is affirmatively notified that he will not be paid by the Commonwealth agency. Darien Capital Management, Inc. v. Com., Public School Employees Retirement System, 549 Pa. 1, 6, 700 A.2d 395, 397 (1997).

PennDOT relies on the following documents and events, listed below in sequence, to support its assertion that Knorr's claim was untimely filed: (1) a letter dated December 29, 2000, in which Knorr informed PennDOT, in general terms, that Knorr contemplated extra costs of over $650,000 for performance of work and for delays on the SR28 project; (2) a PennDOT letter dated January 22, 2001, which informs Knorr that a meeting will be held on January 29 in order to discuss Knorr's concerns about the SR28 project; (3) the meeting held on January 29, 2001 in Engineering District 10-0 offices; (4) a PennDOT letter to Knorr dated May 17, 2001, stating PennDOT's summary and its opinions and conclusions regarding the several issues discussed by Knorr and PennDOT at the January 29 meeting; (5) the Notice of Final Quantities and Contract Settlement Amount sent to Knorr on February 3, 2003; and (6) the filing of Knorr's Request for an Equitable Adjustment with PennDOT on July 25, 2003. PennDOT asserts that Knorr was sufficiently informed of its claim by December 29, 2000 and alternatively its May 17, 2001, letter gave notice to Knorr that PennDOT was rejecting Knorr's claims for additional compensation presented at the January 29, 2001 meeting. Thus, given the six-month statute of limitation set forth in Section 1712.1(a) of the Commonwealth Procurement Code, PennDOT asserts that Knorr was required to file its claim with the PennDOT contracting officer on or about November 17, 2001. Knorr did not file its claim until July 25, 2003.

After a review of the above-listed sequence of events and documents, the Board finds that the letter of December 29, 2000, the meeting on January 29, 2001, and PennDOT's letter of May 17, 2001, were part of an ongoing, interim discussion between Knorr and PennDOT regarding the problems and extra costs incurred by Knorr during the project. The December 29, 2001 letter was not the formal filing of a claim, nor was the May 17, 2001 letter a formal determination of the claim by PennDOT. A review of the December 29, 2000 letter shows that it is not a concise statement of Knorr's claim, because, among other things, it fails to enumerate any of the several categories of damages or the grounds for same. Fairly read, the December 29, 2000 letter simply notifies PennDOT that Knorr was experiencing problems on the project and offers a general (and not entirely accurate) estimate of the cost impact of those problems for which it was beginning to accumulate information, thereby inviting further discussion on the part of PennDOT. That further discussion occurred during the January 29, 2001 meeting between Knorr and PennDOT officials, in which John Fry, the PennDOT representative, stated, "We are just meeting today to gather facts. I will get back to you." (Plaintiff's Exhibit 233).

The problems listed in the May 17, 2001 PennDOT letter were never submitted to PennDOT by Knorr in the form of a claim. The May 17, 2001 letter, instead, was PennDOT's summary of the discussion held with Knorr at the January 29 meeting. Thus, as noted in the opening paragraph of the May 17, 2001 letter, the letter is simply a "response to the Outline of Events that Wayne W. Knorr presented at the meeting." (Defendant's Exhibit D-41). Of the 20 items of work discussed at the meeting and identified in the letter, PennDOT expressed its own view on each issue and in almost all cases asked for additional information. Fairly read, the May 17, 2001 letter is a summary of the initial discussion of problems experienced on the project and is far from a clear and final notification that Knorr will not be paid for claims it has not yet

made. Indeed, had PennDOT itself viewed the May 17 letter as a final determination of actual claims made by Knorr, the Board would have expected PennDOT to follow its regular practice of explicitly stating in the letter that it was a final determination and to advise Knorr of the time within which it could file an appeal of the decision. PennDOT did not do so.

PennDOT did not, in fact, issue its "Notification of Final Quantities and Contract Settlement Amount" and accompanying cover letter until February 3, 2003. It is this document which is widely understood in the industry to be PennDOT's reconciliation and final statement of the total amounts due and paid on the contract. Thereafter, on July 25, 2003, Knorr actually submitted its claim to PennDOT in the form of a Request for Equitable Adjustment to the district engineer seeking $1,743,593.33 in additional compensation.[16] This was done within six-months of the Notification of Final Quantities and Contract Settlement Amount, the point at which we find Knorr's claim to have accrued. Thereafter, PennDOT failed to issue a determination within the 120 days set forth in Section 1712.1(d) of the Commonwealth Procurement Code. Knorr then filed its claim with the Board on December 5, 2003 (i.e. within 135 days of its claim being submitted to PennDOT). Consequently, PennDOT's statute of limitations argument in defense to Knorr's claims is unsupported by the facts of this case and must be denied.

The Board also notes that PennDOT has effectively waived its right to assert a statute of limitations defense in this case by failing to raise this argument in its pleadings. It is, of course, required by rule to raise a statute of limitations affirmative defense in new matter in the answer to a complaint. Pa.R.C.P. 1030. See also, Miller v. Klink, 871 A.2d 331, 333 n.4. (Pa. Cmwlth.

[16] Paragraph 24 of Knorr's complaint states in part that: "On July 25, 2003, Knorr submitted its Claim in the nature of a Request for Equitable Adjustment to the District Engineer seeking $1,743,593.33 in additional compensation under the Contract, which reflects the direct and indirect cost impacts resulting from PennDOT's deficient Project design." PennDOT denies this and the remaining allegations in Paragraph 24 as "conclusions of law to which no response is required." However, the statements made in Paragraph 24 of Knorr's complaint are at least partly factual in nature, and these are quite arguably deemed admitted by PennDOT's general denial. In any case, it does not appear to be a matter of dispute that the Request for Equitable Adjustment was filed with PennDOT as described on July 25, 2003.

2005). The Board acknowledges, as we must, that PennDOT, after reciting various factual allegations in its new matter not related to the timing of Knorr's filings, did state in Paragraph 84 of its new matter: "The above facts provide for multiple affirmative defenses, including, inter alia, accord and satisfaction, estoppel, laches, statute of limitations, and/or waiver and payment." However, PennDOT makes no mention of the December 29, 2000 letter or the May 17, 2001 letter, or otherwise even remotely develops the facts necessary for a statute of limitations defense. The mere recitation of the words "statute of limitations" among other affirmative defenses in a catch-all paragraph, with no attempt to explain or relate the defense to other factual pleadings (and no factual pleadings at all regarding the circumstances it now claims provide this defense) is not sufficient for the Board to consider the statute of limitations defense to be adequately raised. See Pa. R.C.P. 1019(a) and 1030. See also, Miller v. Klink, 871 A.2d 331, 333 n.4 (Pa. Cmwlth. 2005); Pennsylvania Public Utility Commission v. Zanella Transit, 417 A.2d 860, 861 (Pa. Cmwlth. 1980) (defendant must aver material facts in answer and new matter that traverse allegations made in claim); Allen v. Lipson, 8 Pa. D&C.4th 390, 393-94 (C.P. of Lycoming Co. 1990) 1990 WL 313425 at *2 (noting that defendant must plead material facts in new matter upon which defense is based).

PennDOT Supplied Knorr with Inadequate Drawings that Showed Incorrect or Missing Elevations[17]

Knorr asserts that the Contract drawings provided by PennDOT failed to provide accurate roadway elevations in its plans for many areas throughout the approximate two-mile stretch of SR28. It further asserts that this failure, combined with PennDOT's delay in supplying the correct information, delayed and disrupted Knorr's sub-base and paving activities in those

[17] The Board's review of the testimony and documentary evidence as a whole leads us to conclude that the parties sometimes mix the terms "elevations", "super-elevations", "grades" and "slopes." The Board understands that, while these terms have their own distinct meanings, the parties are fundamentally describing the presence, lack, or inconsistency of elevations in the profiles and/or cross sections of the plans as the basic information needed to build the roadway. Accordingly we will typically refer to the subject information as "elevations" or "grades" in our discussion.

areas. In addition to extensive testimony on this issue, Knorr also presented corroborative documentation. For instance, in a letter dated December 29, 1999, issued after Knorr had ceased work for the Winter, Knorr detailed several areas where "profile grade points did not match the cross section plotting," where "no super-elevations" [were] given on the plans," and where "the existing pavement is too high to overlay a minimum 3½." (Plaintiff's Exhibit 132). At a January 28, 2000 meeting with PennDOT project officials, Knorr gave PennDOT a copy of its "pavement buildup comps" highlighting the missing or inconsistent elevations. Knorr re-mobilized for work on or about March 6, 2000, but did not receive missing elevations until March 23, 2000. On April 4, 2000, Knorr received another partial list of revised roadway elevations not contained in the original drawings. Dick Fisher, Knorr's project surveyor, then finished recomputation of the various roadway grades, slopes, and super-elevations on or about April 13, 2000, and sub-base and paving activities began and continued from that day.[18]

The reasons for the initial failure and subsequent delay in supplying correct and consistent elevations were never clearly explained by PennDOT during the trial. In its proposed findings of fact and accompanying brief, PennDOT does not specifically rebut Knorr's contentions regarding these missing and inconsistent elevations.[19] On the evidence presented, the Board concludes that PennDOT was responsible for (1) an initial failure to supply adequate plans to build the project due to its failure to provide necessary elevations in the areas complained of and (2) delay in correcting numerous missing or incorrect grades/elevations. United States v. Spearin, 248 U.S. 132, 137-39 S. Ct. 59 (1918); Canuso v. City of Philadelphia,

[18] See Plaintiff's Exhibits 60 and 277 (Attachment 18) for a summary of the missing "grades" and "super-elevations", and the dates on which they were eventually supplied by PennDOT. See also Plaintiff's Exhibit 17 and Defendant's Exhibit 114.

[19] For example, in its brief, PennDOT acknowledges the six areas of alleged delay as being: (1) the OGS supplier, (2) slope repairs, (3) the box culvert, (4) the redesign of Stations 1820 to 1834, (5) the redesign ("awaiting grades") of Stations 1834 to 1842, and (6) the semi-final inspection. However, PennDOT does not specifically address the failure to supply grades and elevations as set forth in Plaintiff's Exhibit 60.

192 A. 133, 136 (Pa. 1937); Com., Department of Transportation v. W.P. Dickerson & Son, Inc., 400 A.2d 930, 932 (Pa. Cmwlth. 1979); Allentown Supply Corp. v. Stryer, 195 A.2d 274, 279 (Pa. Super. 1963); Angelo Iafrate Const. Co., Inc. v. Pennsylvania Turnpike Commission, 2006 WL 2585020, pp. 29-30, 41-42 (Pa. Bd. Claims 2006) (affirmed by Commonwealth Court in unreported opinion). We further conclude that PennDOT's failure to supply this information, while insisting Knorr proceed with these tasks, constituted active interference with Knorr's work. Coatesville Contractors & Engineers, Inc. v. Borough of Ridley Park, 506 A.2d 862, 865-867 (Pa. 1986); Department of General Services v. Pittsburgh Building Company, 920 A.2d 973, 987 (Pa. Cmwlth. 2007); A.G. Cullen Constr., Inc., 898 A.2d at 1160. These problems delayed and disrupted Knorr's sub-base and paving operations during the period from March 15, 2000, the approximate date on which Knorr was re-mobilized and ready to begin this work, until April 4, 2000, the date on which Knorr received the majority of the missing or corrected elevations.

PennDOT Delayed Knorr's Work on the Sub-base and Paving of the Truck-Climbing Lane by Failing to Timely Address Slope Failure and Instability

The main aspect of the work that was to be performed under the Contract was the creation of a third lane for SR28 running uphill and southward (i.e. a truck-climbing lane), beginning at Station 1837 and ending at Station 1813. In order to create this lane, Knorr had to excavate a significant portion of the hillside between these two stations adjacent to the southbound travel lane. Knorr largely completed this excavation work between August 23 and December 15, 1999 during the initial period of project activity before the Winter Shutdown. However, on September 17, 1999, Knorr had notified David Schaffer, who functioned essentially as PennDOT's on-site supervisor for the project, that the slope being excavated was unstable and "may not stand" if Knorr continued to cut the slope as detailed on the Contract drawings.[20] Mr. Schaffer notified Tom Polacek, a geotechnical engineer for District 10-0, of Knorr's

[20] David Schaffer was PennDOT's transportation construction inspection supervisor on the project.

concerns. Mr. Polacek visited the project site on September 21, 1999 and indicated that the slope should still be cut as shown on the Contract drawings.

After the Winter Shutdown, two areas of the 2,400-foot slope excavation had "failed" with the ground cracking and dirt and other material sliding down the hill to the base of the slope. Although the areas that failed totaled only about 160 feet in length, a "fault line" that represented an initial cracking of the ground ran through a considerable portion of the 2,400-foot slope. Between March 22, 2000 and May 1, 2000, PennDOT engineers visited the project site and/or conducted meetings on several occasions and discussed (both with and without Knorr) various solutions for fixing the unstable slope. Although PennDOT's solutions to the slope problems varied over this period, the common characteristic, as conveyed to Knorr, was to wait for a slope area to fail and to then repair it.

While waiting for PennDOT to determine a final solution and issue a definitive direction to repair the failed areas and address the slope instability problem, Knorr ceased working on the truck-climbing lane between Stations 1813 and 1837 over concern that continued slope failure would interfere with, or damage, any sub-base and paving work done on the new truck-climbing lane along the foot of the slope excavation. After waiting for a final decision and direction by PennDOT on the slope failures and instability issue since it first arose in the Fall of 1999, Knorr was finally given definitive instruction by PennDOT and promptly performed its first slope repair between May 3 and May 8, 2000 from Stations 1826+13 to 1827+26. Knorr's second slope repair was then delayed for an additional period of time as PennDOT sought to acquire a necessary right of access to adjacent land from the Pennsylvania Game Commission. Once this right of access was acquired and further modification was made by PennDOT to the slope repair protocol, Knorr was advised to proceed with the second repair on June 23, 2000. Knorr then performed this second slope repair on Monday, June 26, 2000, from Station 1827+32 to Station

1827+77. With some variation, the repair operation basically encompassed adding drainage trenching, over-excavating the slope around the failed area and installing a stone sub-base commencing with large diameter rock at the base with progressively smaller diameter stone moving up the slope underneath a topsoil cover.

Knorr contends that the delay by PennDOT in addressing finally how Knorr was to fix the slope failure and instability problems forced Knorr to delay its sub-base and paving operations along the entire 2,400-foot stretch of the truck-climbing lane for a critical period of time in the early Spring of 2000. Knorr asserts that PennDOT's desire for a low-budget solution for the problem of slope instability was understandable, but that PennDOT failed to acknowledge the impact its many weeks of indecision in resolving this problem had on Knorr's contemplated plan of construction. Knorr asserts that, although it was not strictly prohibited by PennDOT from working on the truck-climbing lane during this time, PennDOT's delay in deciding upon and directing a final solution effectively precluded Knorr from conducting sub-base and paving activities along the climbing lane due to a very real concern that even more slope would fail and Knorr would be forced to drive heavy equipment over a substantial portion of any newly built roadway, destroying same, in order to re-excavate and fix future failed areas of the slope. Thus, Knorr postponed its efforts to lay the sub-base and pave the truck-climbing lane until late June 2000, after it was finally authorized by PennDOT to fix the problem areas of the slope.

PennDOT argues in response that Knorr failed to provide any geotechnical evidence that the slope failure was caused by a faulty design; that PennDOT did respond to this issue without delay; that there was no physical reason Knorr could not have pursued the sub-base and paving activities while awaiting the final solution to the slope instability; and that the actual areas that failed were relatively minor compared to the entire 2,400-foot stretch of road. In addition, PennDOT points out that an eight-foot "drop zone" specifically intended to catch all falling

material was part of the project design and would have caught any falling material from a failing slope. Thus, PennDOT concludes that there is no evidence that Knorr was impeded in its progress of conducting sub-base and paving operations along the truck-climbing lane due to slope instability problems.

Although we see some merit to the arguments on each side, we conclude that the weight of evidence presented establishes that PennDOT failed to timely supply Knorr with adequate plans and direction to address the slope instability problems on the project and that this failure was the primary and material cause of the delay to Knorr's sub-base and paving operations along the truck-climbing lane. In regard to PennDOT's observation that Knorr failed to present geotechnical or other expert evidence that the slope failure was due to a faulty design, we believe this argument misses the point. The question here is not the technical one of proving a "design defect" in the original plans by way of expert testimony or otherwise. The question, instead, is whether PennDOT failed to provide adequate design specifications and/or failed to timely modify its design specifications to address the slope instability problems. The Board is fully capable of deciding this issue on the facts presented without need of expert testimony on design defects. See e.g., United States v. Spearin, 248 U.S. 132, 137-39 S. Ct. 59 (1918); Canuso v. City of Philadelphia, 192 A. 133, 136 (Pa. 1937); Com., Department of Transportation v. W.P. Dickerson & Son, Inc., 400 A.2d 930, 932 (Pa. Cmwlth. 1979); Allentown Supply Corp. v. Stryer, 195 A.2d 274, 279 (Pa. Super. 1963); Angelo Iafrate Const. Co., Inc. v. Pennsylvania Turnpike Commission, 2006 WL 2585020, pp. 29-30, 41-42 (Pa. Bd. Claims 2006) (affirmed by Commonwealth Court in unreported opinion). Similarly, the Board is capable of determining whether or not PennDOT's action or inaction on these problems constituted active interference with Knorr's work on the project. Coatesville Contractors & Engineers, Inc. v. Borough of Ridley Park, 506 A.2d 862, 865-867 (Pa. 1986); Department of General Services v. Pittsburgh

Building Company, 920 A.2d 973, 987 (Pa. Cmwlth. 2007); A.G. Cullen Constr., Inc. v. State System of Higher Education, 898 A.2d 1145, 1156-1157 (Pa. Cmwlth. 2006).

In this case, the existence of slope failures and instability along the truck-climbing lane made it apparent that some modification was required to the original design. It is also apparent that PennDOT's interference with Knorr's work generates from its "wait and see" approach and its failure to adopt a final slope repair plan and give direction to Knorr that addressed slope failures and instability in a timely manner while insisting Knorr proceed with the work dependent on successful completion of the slope excavation (i.e. construction of the truck-climbing lane). See, Coatesville Contractors & Engineers, Inc. v. Borough of Ridley Park, 506 A.2d at 864-67; Department of General Services v. Pittsburgh Building Company, 920 A.2d 973, 987 (Pa. Cmwlth. 2007);

We also find PennDOT's remaining arguments unpersuasive. Although, in retrospect, the slope failures constituted only a relatively small portion of the 2,400-foot slope cut, we believe Knorr's concern at the time, that the entire slope (or at least a significant portion thereof) would fail, to be reasonable and fully justified. If it had, much, if not all of the work on the truck-climbing lane below the slope would had to have been redone. Neither do we find an adequate solution in the eight foot "drop zone" designed to catch at least some quantity of material from a subsequent slope failure. Even if the eight foot "drop zone" would have caught the majority of a slide along the slope, this would not have eliminated the need for heavy equipment to travel over (and tear up) any sub-base and paving previously placed in order to repair such a slide. Tellingly, even Sarah Cunningham, PennDOT's assistant construction engineer for the project, indicated that she could understand why a contractor would want the slope problems finally resolved before continuing the sub-base and paving work, since it was the contractor who would be held responsible for sequencing its work and repaving any damaged

roadway. Ms. Cunningham also acknowledged that she was not certain of what would have been the "best practice" for proceeding in this case. Because the Board finds the foregoing concerns expressed by Knorr to be reasonable and fully justified by the facts at the time, the Board concludes that PennDOT's failure to timely supply Knorr with adequate plans and direction to address the slope failures and instability on this project actively interfered with Knorr's progress in constructing the truck-climbing lane and materially delayed and disrupted that operation during the period from approximately March 22, 2000 (the date on which Knorr could have commenced construction of this climbing lane) to June 26, 2000 (the date when Knorr could perform its final slope repair per PennDOT instruction).[21]

Plant Verification Testing of Knorr's OGS Supplier

"OGS" is an "open graded sub-base" consisting of small stones that are put down in a roadway over a slightly larger "2A" stone in order to form the sub-base for subsequent paving material. Knorr needed this material in order to construct the truck-climbing lane and to widen certain areas of the shoulder along the two-mile stretch of SR28. In accordance with the applicable 408 Specifications,[22] Knorr submitted, and PennDOT approved, Knorr's selection of Grange Lime & Stone ("Grange") as Knorr's supplier of 2A stone and OGS at the commencement of the project. This was documented by letter dated August 24, 1999. On March 16, 2000, shortly after Knorr had mobilized to re-commence work on the project after the Winter Shutdown, PennDOT informed Knorr that Grange had suffered an "OGS failure" and that Knorr was not to use OGS from Grange until further plant verification testing had been completed. Thereafter, on May 8, 2000, Mr. Schaffer, PennDOT's chief inspector on the project,

[21] Because we calculate the duration of this slope repair problem on the basis of the delay while awaiting access and direction on the method for final slope repair, our calculation does not depend on the days spent actually performing the slope repair in assessing the duration of this problem which contributed to the overall delay experienced by Knorr on the project.

[22] See Section 106.02 of the 408 Specifications (1994); PennDOT's Bulletin 14, Publication 14 (Defendant's Exhibit D-32).

was informed by other PennDOT personnel that OGS from Grange was still not approved for use because it did not meet the material standards set forth in the 408 Specifications. However, Knorr itself never received written notice that the plant verification testing was completed nor did it receive the results of this testing. Eventually, Knorr sought a new supplier of OGS, and, on May 10, 2000, Knorr received verbal approval from PennDOT to use Glacial Sand and Gravel as its new OGS provider.

Knorr asserts that PennDOT had a contractual obligation under Section 106.03(a) of the 408 Specifications to perform the testing of Grange's OGS, and that for approximately seven-weeks, from March 16, 2000 to May 8, 2000, PennDOT either failed to conduct any testing or failed to timely report to Knorr the definitive results of PennDOT's tests on the Grange OGS for use on the SR28 project. During this period of waiting for the PennDOT test results of Grange OGS, Knorr asserts it could not proceed with its sub-base and paving operations for the truck-climbing lane. Knorr claims it waited for this seven-week length of time because it expected that the plant verification testing would be completed in about two weeks and it would then be informed of the results. Allowing PennDOT a two-week period in which to conduct the testing, Knorr contends that it was delayed from PennDOT's failure to test and/or report its testing of the OGS from April 1, 2000 to May 10, 2000. This latter date is the day on which PennDOT gave verbal approval to Knorr's request to use Glacial Sand and Gravel as its alternate supplier of OGS.

In contrast, PennDOT responds that the Contract specifications do not guarantee that any particular supplier of OGS or any other material will be available to a contractor such as Knorr. PennDOT further asserts that, regardless of what it said or did not say to Knorr after its initial communication that there was a problem with Grange's OGS, Knorr had the contractual responsibility to obtain OGS from whatever other suppliers were available and approved

whenever Knorr decided it actually needed OGS. PennDOT points out that a number of other suppliers of OGS were in the general vicinity of the SR28 project, and that Knorr could have changed suppliers at any time. PennDOT further asserts that, in any case, Knorr was not ready to lay OGS until sometime in early May 2000, and that when it was ready for OGS application, Knorr did, in fact, acquire its OGS from another approved supplier.

Knorr has not provided the Board with evidence to establish that PennDOT's actions in suspending Grange as a supplier of OGS were not in conformance with the Contract's specifications, and Knorr does not dispute PennDOT's authority to do so. What is at issue here is whether or not PennDOT's action of notifying Knorr that there was a problem with Grange's supply of OGS, and then either failing to conduct the plant verification test or failing to report the results of those tests to Knorr in a timely manner makes PennDOT liable for delay to Knorr's work.

Section 106.03(a)(1) of the 408 Specifications assigns to PennDOT the responsibility for conducting "acceptance testing" of all materials used on a project. By this section alone, one might conclude that PennDOT, in failing to conduct such testing for some seven weeks, was responsible for Knorr's delay in beginning its sub-base work on the truck-climbing lane. However, on review of the record, the Board agrees with PennDOT that Knorr was not prepared to begin extensive sub-base work in the middle of March or even during the month of April 2000 (largely as a result of the other problems noted in this opinion). For this reason, we find that Knorr essentially followed the course of action PennDOT has suggested above and did not actually incur any delay from this problem.

Specifically, Knorr waited until it was prepared to lay OGS sub-base along the roadway and then engaged Glacial Sand and Gravel to supply the OGS. Mr. Knorr, testifying from his own recollection, stated that Knorr was not ready to lay OGS in significant stretches of the

roadway until late April 2000. Mr. Schaffer, PennDOT's chief inspector, noted in his diary entry of May 8, 2000, that Grange's OGS still could not be used because it did not meet the requirements of the 408 Specifications. Whether because Mr. Schaffer did then inform Knorr of continued problems with Grange's OGS, or simply because Knorr felt it could wait no longer, Knorr obtained a new OGS supplier on May 10, 2000. The Board also notes that, on that day, Willie Confer, Knorr's project manager, recorded in his diary that Knorr was "ready for OGS." Mr. Confer's notation is the only documentary evidence presented to the Board of when Knorr itself felt it was ready to begin using OGS.

On the basis of the foregoing evidentiary record, the Board concludes that Knorr has failed to present sufficient evidence to show that the seven-week delay in conducting and/or reporting the verification testing for the Grange OGS was the cause of any delay to Knorr's sub-base work. Consequently, the Board does not accept this factor as being an independent reason for finding any additional delay or disruption to Knorr's work on the project.

PennDOT's Changes to the Specifications for Roadway Shoulder Renovation From Stations 1820 to 1844

As originally contemplated in the Contract, Knorr was to refurbish and/or widen the roadway shoulder between Stations 1820 and 1834 in order to maintain two-to-four feet of width by "milling" the existing shoulder and placing four inches of blacktop over same. From Stations 1834 to 1844, the Contract required Knorr to do some "full-depth widening" of the roadway shoulder (i.e., Knorr was to excavate down some 19 inches and lay down sub-base materials and build up layers of asphalt to a new surface to replace the roadway shoulder). On April 26, 2000, about seven weeks after Knorr had re-mobilized for work after the Winter Shutdown, PennDOT received a report that another section of the roadway or shoulder, which had been widened with only four inches of blacktop in the same manner as Knorr was to widen the shoulder from Stations 1820 to 1834, had cracked because of the weight of traffic passing over it. On May 1,

2000, PennDOT informed Knorr that, because of the failure at these other locations on the job, PennDOT would be changing the original plans for widening the shoulder between Stations 1820 to 1834. On May 9, 2000, PennDOT approved a change to the roadway shoulder which required Knorr to do a "full-depth widening" from Stations 1820 to 1834. As a result, Knorr's work was delayed between Stations 1820 to 1834 during the period from May 1, 2000 (the date on which Knorr was notified that PennDOT would be changing the nature of the original shoulder work) until May 9, 2000 (the date on which PennDOT approved the change to a full-depth widening for these sections and advised Knorr of same).

For Stations 1834 to 1844, PennDOT also changed the original design specifications by expanding the already planned full-depth widening by an additional five to six feet in width. However, complete plan revisions for Stations 1834 to 1844 (including new elevations required by the addition of six feet of shoulder width to these sections) were not received by Knorr until July 19, 2000. Thus, Knorr, was delayed from proceeding with at least a portion of this roadway shoulder work between Stations 1834 to 1844 during the period from May 1, 2000 (the date Knorr was ready to proceed with roadway shoulder widening) to July 19, 2000 (the date on which Knorr received complete and final plan revisions and elevations for widening the roadway shoulder between Stations 1834-1844).

PennDOT argues that Knorr failed to present technical evidence of a "design" change to the roadway shoulder and that the changes complained of to the roadway shoulder represented "field adjustments" that are common and of minor importance on the project. PennDOT also asserts that Knorr has failed to prove any actual impact upon Knorr's planned sequence of work from these changes to roadway shoulder construction.

Regardless of whether the changes ordered by PennDOT are properly characterized as "design changes" requiring an engineer's approval or "field adjustments" to the construction

specifications, the changes effected by PennDOT to some 2,200 feet of the roadway shoulder are clearly modifications to design (not performance) specifications of the project. See e.g., A.G. Cullen Constr., Inc. v. State System of Higher Education, 898 A.2d at 1156-1160 (and cases cited therein). It is equally clear that these modifications are PennDOT's choice and responsibility. These changes caused Knorr to incur additional time and expense to do the additional work beyond that contemplated in Knorr's original contract. However, in addition to the time and expense to do the additional work (for which PennDOT asserts Knorr was compensated by force account), Knorr was also delayed and disrupted in prosecuting its original contract by the delayed manner in which PennDOT introduced then later implemented these changes (delay and disruption for which Knorr was not compensated).

Specifically, the Board finds that PennDOT's changes to construction of the roadway shoulder from Stations 1820 to 1844 were material changes to the design specifications and a material factor in delaying the progress of Knorr's original sub-base and paving work in three respects: A) delay during the period May 1 to May 9 waiting for PennDOT to confirm its instruction to change to full-depth widening of the shoulder from Sections 1820 to 1834; B) delay during the period May 1 to July 19 awaiting proper plans and corrected grades for a portion of the expanded shoulder widening from Stations 1834 to 1844;[23] C) delay from actually performing the additional work beyond that contemplated in the original project plans. While it appears that Knorr was compensated for the delay and cost incurred in actually doing the extra work entailed in the roadway shoulder changes (per Item C above), Knorr has not yet been compensated for the delay and disruptions caused by PennDOT's delay between notifying Knorr

[23] While PennDOT can argue that the instruction to change from the four inch asphalt overlay to the full-depth construction on the shoulder widening between Stations 1820 to 1834 could be accomplished substantially by following the existing specifications and elevations, PennDOT's decision to expand the width of the shoulder as well as the depth of construction between Stations 1834 to 1844 required new and additional elevations before Knorr could reasonably be expected to prosecute this latter work (which additional elevations were not fully provided timely by PennDOT).

of these changes to the widening shoulder renovation (thereby precluding work in these areas) and providing definitive instruction and necessary plans for this changed work per Items A and B above. However, because a portion of the overall delay attributed to PennDOT's changes to the original shoulder work is concurrent with delays attributable to other causes such as the slope instability issue, we will address attribution of the various causes for Knorr's delay to the total days of delay on the project in more detail in a subsequent section of this opinion.

Knorr also asserts that these changes to the design specifications of the roadway shoulder contributed not only to the overall delay suffered by Knorr, but caused Knorr to incur substantial additional costs associated with disruption to its maintenance and protection of traffic costs in these areas and for out of class work for which it has not been fully compensated. More specifically, Knorr claims that it should have been compensated for at least some of the additional excavation associated with the added full-depth widening of the shoulder through the Class 1B rate, as opposed to the lower Class 1 excavation rate asserted and paid by PennDOT. Knorr also asserts that the changes to the original shoulder widening procedure also contributed to its need to hop-scotch around the site (disrupting its flow of work) and, even more significantly, disrupted its plan for the maintenance and protection of traffic ("MPT") in these areas as discussed below.

In regard to its claim for out-of-class work, Knorr argues that throughout the stretch of roadway from Stations 1820 to 1834, the full-depth widening that PennDOT instituted as part of its changed shoulder work increased Knorr's excavation costs by requiring much more of the more difficult and time consuming Class 1B excavation, but PennDOT only paid for this at the Class 1 rate. Class 1 excavation work is generally bulk excavation associated with roadways, the placement or removal of topsoil, and the removal of unsuitable material with a bottom width of 8 feet or more. Class 1B excavation work is work related to roadway rehabilitation, sawcutting

and removal of existing pavement to neat lines. Because the full-depth widening performed by Knorr on the project involved milling the roadway to a neat cut along existing pavement in order to facilitate connecting (and sealing) the joint between old and new pavement, we find the excavation at issue was more akin to the rehabilitation of the existing roadway shoulder described by Class 1B as opposed to the bulk excavation of Class 1. Accordingly, the Board is persuaded that Knorr is entitled to the Class 1B excavation rate for this work.[24]

Additionally, Knorr argues, in essence, that when PennDOT changed the specification for widening the roadway shoulder from four inch milling and overlay procedure to full-depth widening in the area from Stations 1820 to 1834, this change precluded Knorr's original expectation that it could accommodate the safe passage of two-way traffic through this area. Instead, Knorr claims that this change forced it to utilize one-lane travel and flagmen on a 24-hour-a-day basis for longer periods of time than it had reasonably anticipated, thereby increasing its costs for the maintenance and protection of traffic significantly from that required by the original contract plans. As we understand Knorr's argument, much of the shoulder widening under the original construction plan was to be accomplished by simply milling and retopping the shoulder with a 4" layer of asphalt. This method, Knorr asserts, allowed for a relatively quick and easy way of widening the existing roadway and allowed for two 10-foot wide travel lanes while work otherwise proceeded on the truck-climbing lane on the opposite side of the roadway. However, when PennDOT changed the work on the roadway between Stations 1820-1834 to instead require full-depth widening of the shoulder, this involved greater incursion (cuts) into the existing roadway. Thus Knorr's ability to attain the additional width necessary for two travel lanes was eliminated in a far greater area then initially anticipated. Additionally, the full-depth

[24] PennDOT's argument on this issue, most succinctly summarized by Mr. Eberhardt at pp. 58-63 of his expert report. Even Mr. Eberhardt, however, acknowledges ambiguity in the contract materials on this point. Such ambiguity is properly construed against its drafter (i.e. PennDOT).

widening in these areas was more involved and took longer, thereby significantly increasing flagman time for MPT.

PennDOT, and particularly its expert, Mr. Eberhardt, disputes Knorr's assertions regarding increased MPT costs due to the changes to the shoulder widening on several counts. Mr. Eberhardt asserts that, inter alia: (1) Knorr would have had to intrude upon the roadway travel lane to perform the four inch milling procedure in any event (even if only to accommodate the width of its equipment), thus requiring a shut down of the adjacent travel lane even with the four inch milling procedure; (2) the removal of the old asphalt in the four inch milling method also intruded into the adjacent travel lane; (3) a drainage trench deeper than four inches had to be dug even when using the four inch milling procedure; and (4) this whole full-depth widening for Stations 1820 to 1834 did not take two weeks but was accomplished between 5/23/00 and 5/25/00. (Defendant's Exhibit 115, pp. 39-42). Mr. Eberhardt also argues that the addition of extra width to the outside of the full-depth shoulder widening originally planned for Stations 1834 to 1844 did not in any way change the incursion into the travel lane from that needed originally for these areas. (Defendant's Exhibit, pp.43-44). Thus, Mr. Eberhardt asserts the changes to the roadway shoulder widening specifications caused no material increase to Knorr's MPT costs.

The Board is in substantial agreement with Mr. Eberhardt on this issue. Specifically, we agree that adding the additional width to the outside of the roadway shoulder to the full-depth widening already planned between Stations 1834 to 1844 entailed no material change to the incursion on the adjacent travel lane or the MPT procedures needed from that needed for the original design specifications. Additionally, we do not see this minor extra width as adding materially to the time needed to perform this operation. With regard to the change to full-depth widening between Stations 1820 to 1834, we also agree with Mr. Eberhardt that incursion into

the adjacent travel lane would have been necessary even with the four inch milling procedure originally planned. Moreover, while we would have expected the full-depth widening procedure to have taken longer than the four inch milling procedure (at least to some degree), the field diary entries cited by Mr. Eberhardt and included in attachment 34 to his report establishes that the total single lane travel and flagmen's time actually needed for this process appears not to exceed 48 hours (5/23/00 AM to 5/25/00 4 AM). Even the four inch milling procedure would have taken a fair portion of this time period as well. Thus, the Board concludes that Knorr has failed to establish a material increase in its MPT costs due to the changes for the shoulder construction.

Failure to Timely Supply Adequate Plans for Paving in the Box Culvert Area

Knorr asserts that PennDOT delayed sub-base and paving activities around the box culvert in the Spring of 2000 by failing to provide all the necessary and correct roadway elevations until July 10, 2000. Knorr also claims that it is entitled to delay and disruption damages for these elevation problems experienced from April 20, 2000 (the date on which Knorr discovered the missing or inconsistent grades around the box culvert and requested correction from PennDOT) to July 10, 2000 (the date on which Knorr received all the necessary grades and elevations for the roadway around the box culvert).

In addition to its assertion that the fully corrected roadway grades around the box culvert were actually provided to Knorr on April 12, 2000, not July 10, 2000, PennDOT points to Knorr's failure to follow the D-476 schedule for constructing the box culvert and its decision to defer this work until the Spring of 2000 as the primary cause of delay in the box culvert work. PennDOT also argues that Knorr created several work inefficiencies of its own in this area. As a result, PennDOT argues there is no basis for concluding that it delayed or disrupted Knorr's work on the box culvert and the surrounding roadway.

As recounted earlier in this opinion's Findings of Fact, the Contract plans called for the demolition and replacement of an existing bridge structure crossing Bostonia Run between Stations 1851 and 1852. The new bridge was to be constructed from prefabricated concrete box culvert sections and were to be installed in two phases in order to allow one lane of traffic to travel over Bostonia Run at all times. According to the D-476 schedule, work was to commence on "Phase I" of the box culvert on August 24, 1999 and was to be completed on September 24, 1999. Thereafter, traffic was to be rerouted to the opposite lane newly replaced during Phase I while work on "Phase II" was to begin on October 1, 1999 and be completed on November 7, 1999. However, Knorr determined relatively early on in the project that it would not be physically possible to commence or complete the box culvert construction per the D-476 schedule because, inter alia: 1) the extra 10 days due to the late Notice to Proceed had pushed the already tight schedule for construction of the box culvert past the point when the paving associated with the installation of the box culvert could be accomplished before PennDOT's Winter paving cutoff deadline[25] and 2) it was impossible, as a practical matter, to get the necessary "shop drawings" for the box culvert sections produced, approved by PennDOT, and then have the box culvert sections manufactured in time to properly install before Winter weather as contemplated by the D-476 schedule. Mr. Knorr also noted that, had Knorr attempted to complete this box culvert work in the Fall of 1999 under the circumstances as they existed, the single lane of traffic occasioned by the box culvert installation process would have posed serious traffic and workplace safety issues over the Winter and impaired Knorr's access to the work site thereby slowing Knorr's bulk excavation functions and progress on the entire project. As a result, Knorr chose instead to concentrate on the bulk excavation and drainage installation in the

[25] In order to avoid an adverse effect on new paving being laid by cold or untenable weather, PennDOT prescribes a general cutoff deadline in the Fall and a start date in the Spring for paving operations of October 31 and April 1 (unless otherwise permitted in writing by the District Engineer). Pub. 408 Specifications, Section 401.3(a).

Summer/Fall of 1999, accelerating its progress on this portion of its work in order to compensate for the timing problems with the box culvert noted above and allow Knorr to maintain the D-476 schedule overall when it re-mobilized in the Spring after suspending operations for the Winter.

PennDOT is correct that the D-476 schedule (which became the project schedule by default) shows that work on the box culvert was to be pursued in the Summer/Fall of 1999 and be completed by November 7, 1999. We also note PennDOT's assertion the box culvert was designed to withstand traffic loads without having any paving material laid over it, so that it could have been installed and traffic routed over it in the Fall of 1999 as scheduled with only a temporary asphalt paving leading up to it.

Although the Board does not necessarily disagree with PennDOT's explanation of the manner in which the box culvert installation could have been completed by some point in time after the October 31, 1999 general paving cut-off, we still do not agree that such completion could reasonably be extended indefinitely into the Winter or that this argument addresses the other issues raised above by Knorr. Most particularly, we agree with Mr. Knorr's assertion that the necessary shop drawings could not reasonably be prepared (by the box culvert supplier), approved by PennDOT and then manufactured by the supplier in the 11 days between the August 13, 1999 Notice to Proceed and the August 24, 1999 scheduled commencement of Phase I of the box culvert replacement. In fact, we find the late September date for PennDOT's approval of box culvert drawings to indicate good submittal and approval turnaround times by Knorr and PennDOT, respectively, but that this still does not account for the additional time needed to manufacture the box culvert sections. In short, our analysis indicates that, allowing for reasonable lead time, box culvert installation could not realistically have commenced until mid to late October 1999, thereby pushing a realistic completion date for both phases of box culvert construction into deep Winter weather in late December or early January of 2000 (assuming, of

course, that such Winter work would proceed at a Fall pace). Additionally, the Board agrees with Mr. Knorr's concern over the need for single lane traffic during box culvert construction and finds this a further reason not to engage in this aspect of the SR28 project in the Winter (for safety as well as efficiency reasons). Accordingly, while the Board does not readily condone deviation from an agreed upon construction schedule, we find Knorr's decision to accelerate its bulk excavation and preparatory work during the Summer/Fall of 1999 and postpone an attempt to construct the box culvert until the Spring of 2000 to be an eminently reasonable variation from the D-476. In fact we find that this deviation actually gave Knorr the most realistic possibility of maintaining the overall schedule completion under the circumstances of the project. It is, perhaps, for one or more of the foregoing reasons, that we also find a lack of any contemporaneous written protest or persuasive testimony from PennDOT that it objected to Knorr's Winter Shutdown or the decision to postpone box culvert construction at the time. Moreover, we do not agree with PennDOT's implication that, had Knorr attempted to follow the D-476 schedule and began installation of the box culvert during the Fall of 1999, that Knorr would surely have discovered the missing elevations earlier and notified PennDOT of this problem long before April 20, 2000. Specifically, had Knorr commenced the box culvert installation in the Fall of 1999, every indication (and Mr. Schaeffer's post-October 31 scenario) suggests that Knorr would not have commenced permanent paving around the box culvert area until the Spring of 2000 in any event. On all these facts, the Board concludes that Knorr's decision to delay commencement of the box culvert installation was not a material factor in creating the delay in the sub-base and paving work around the box culvert area in Spring 2000.

Knorr re-mobilized after the Winter Shutdown and commenced work on the box culvert on or about March 15, 2000. On April 11, 2000, Brian Heeter, a PennDOT transportation construction inspector, noted in his diary that there were problems with inconsistent "grades" in

the box culvert area and that he was traveling to the District 10-0 engineering office to review "blown" elevation(s) in the vicinity of the box culvert. Knorr employees also noted that the roadway elevations for the centerline also were inconsistent and created problems with drainage for a nearby diner parking lot. Although Mr. Heeter was adamant that he quickly resolved these elevation problems around the box culvert, the substantial weight of evidence instead supports Knorr's contention that corrected elevations adequate to do the paving in and around the box culvert were not provided to Knorr until July 10, 2000. From May 17, 2000 until July 10, 2000, when Knorr finally received the necessary corrective roadway grades and elevations around the box culvert, little work was performed on the roadway in the area of the box culvert. Knorr eventually completed the box culvert and adjacent paving sometime in late August or early September 2000.

Knorr had a right to expect that PennDOT had provided it with correct plans and drawings that accurately reflected the project site and the work to be performed there, and PennDOT had the responsibility to provide accurate plans and specifications adequate to build the roadway contracted for. PennDOT also had the responsibility to respond to problems with such plans and specifications in a prompt and timely manner. Upon review of the evidence as a whole, the Board has concluded that PennDOT did not do either in this case with respect to the roadway elevations around the box culvert.[26] Therefore, while the Board acknowledges PennDOT's evidence that Knorr created some problems of its own with some ill-conceived pumping operations it conducted around the box culvert, we also conclude that the relatively minor delay created by these problems were subsumed by the delay created from the missing/inconsistent grades surrounding the box culvert.

[26]Although PennDOT (and Mr. Heeter in particular) asserted that PennDOT did provide the corrected grades and elevations by April 12, 2000, we find Knorr's testimony and the weight of evidence presented to instead establish that all the necessary corrections were not provided until July 10, 2000.

As a result of the foregoing, the Board finds PennDOT responsible for the delay and disruption in paving operations around the box culvert in the Spring of 2000 due to its failure to supply all the necessary and correct roadway elevations needed until July 10, 2000. We also hold PennDOT's failures in this regard to constitute active interference with Knorr's work, making it accountable for the delay and disruption experienced by Knorr with respect to this box culvert work.

PennDOT's Scheduling of the Project's Semi-Final Inspection

Knorr's final claim is that it suffered additional delay damages on account of PennDOT's failure to timely schedule the "semi-final inspection" for the SR28 project.[27] In essence, Knorr asserts that, although its actual work on the project was substantially complete and ready for initial inspection on or about November 8, 2000 when it requested same, PennDOT's delay of 29 days before performing this inspection was unreasonable and contributed to the delay in completing the project. As a result, Knorr claims it could not demobilize some of its men and equipment until December 7, 2000, when the semi-final inspection meeting was eventually held and it then knew what further work would be demanded by PennDOT to finally complete the project. Knorr's expert on construction delays and damages, Mr. Rhodes, stated that the period from November 8, 2000, when Knorr requested the semi-final inspection, to December 7, 2000, when it was held, accounts for about 10% of Knorr's claimed delay damages.

PennDOT points out that Knorr did not request an earlier date for the semi-final inspection or object to the December 7, 2000 date selected by PennDOT. PennDOT also asserts

[27] Although referred to in Publication 408 specifications as a "final inspection" this process actually begins with an inspection of work once a project is "substantially complete" (i.e. when 90% of the project work is complete and the project can be used for its intended purpose). This "semi-final" inspection then establishes what additional or corrective work and documentation is required (typically with the specificity of a punchlist of items) in order to bring the project to full completion, schedule an actual final inspection and certify same for acceptance by PennDOT. Publication 408 Specifications § 110.08.

that Knorr has not provided other evidence that PennDOT's response to Knorr's November 8, 2000 request was unreasonable.

Section 110.08(a) of the 408 Specifications, relating to the "final inspection," does not state a timeframe within which the initial inspection must be held. It provides only that, once the project is substantially complete, the parties must "make arrangements for a mutual final inspection." The evidentiary record does not show that Knorr objected at the time in any manner to the December 7, 2000 semi-final inspection date, nor does the evidentiary record show what other considerations went into PennDOT's decision to schedule the semi-final inspection for December 7, 2000. In addition, although Mr. Rhodes stated that 10% of Knorr's delay damages could be attributed to the period from November 8 to December 7, 2000, neither Mr. Rhodes or Mr. Knorr itemized the equipment or manpower that remained on the job site during this time period, or even gave examples of same. Given this scant evidentiary record, the Board concludes that Knorr has not carried its burden of establishing that PennDOT violated any contractual obligation by its scheduling of the semi-final inspection or that Knorr incurred delay damages of a material nature due to same.

PennDOT's Argument that Knorr Has Already Been Compensated For Its Delay And Other Claims By Force Account

PennDOT's third preliminary argument in defense, for which we postponed discussion, begins with the assertion that Knorr has already been fully compensated by way of force account or contract unit price for much (if not all) of the claim it now asserts here. Specifically, PennDOT points out that 9 of 11 items of work listed in an August 21, 2000 letter (Plaintiff's Exhibit 128), which granted Knorr a 61-day time extension, were compensable and paid to Knorr as force-account items and asserts the other 2 items were paid for by "contract unit prices." PennDOT asserts that these methods of payment (outlined in Section 110.03) included markups for labor, equipment and materials, and thus fully compensated Knorr for the extra work

associated with the problems for which the time extension was granted. PennDOT also asserts that Section 111.02 in the 408 Specifications otherwise limits the amount of overhead that Knorr may claim.

Section 110.03 of the 408 Specifications, which deals with additional work, extra work, and extra work paid for on a force-account basis, states, in pertinent part:

> Work identified in Sections 104.02 and 104.03 will be paid, if authorized in writing by the District Engineer, as additional work, extra work, or extra work on a force account basis. Compensation will be limited to the work authorized in writing and actually performed. . . .
>
> . . . .
>
> Payment for additional work, extra work, and extra work on a force account basis is accepted as payment in full for all profit and for all equipment, labor, material, field overhead, home office and general administrative expenses, and every other expense incurred as a result of the additional or extra work. No claims for additional compensation of any kind arising out of or relating to such work can be asserted against the Department with the Board of Claims.

The Board finds little merit to this third defense argument of PennDOT's. To begin with, only 3 of the 11 items identified in the August 21, 2000 letter (granting the 61-day time extension) address matters even remotely akin to the issues for which Knorr seeks delay damages. In fact, the two slope repairs and the change to full-depth shoulder widening between Stations 1820-1834 (accounting for 9 days to do this extra work) are the only issues which we see even remotely connected to Knorr's delay issues. Secondly, by its literal terms, Section 110.03(a) applies to compensate a contractor only for the additional time or extra man-hours, equipment, material and other related costs incurred to perform the additional or extra work that has been authorized. Thus, any claim for damages on account of delay caused to Knorr while waiting: 1) for PennDOT to decide if and how to address the slope instability problem; 2) for PennDOT to decide whether or not to change to full-depth widening of roadway shoulder sections or expand shoulder width; or 3) for PennDOT's delay in providing missing and/or corrective grades and elevations for roadway and shoulder sections before Knorr could commence its work would not

be encompassed by the above noted force account provision (for actually doing the extra work). Thus, Section 110.03 is not applicable since we find that the 11 items of work identified in the August 21, 2000 letter (for which PennDOT claims force account payments were made) are not, as a matter of fact, part of the problems causing Knorr's claimed delays and disruptions for which the Board will grant relief.

Additionally, Section 111.02 of the 408 Specifications, which limits recovery of home office overhead costs to 10% of the extra labor, material and equipment costs attributable to any delay, is likewise inapplicable in this case. To begin with, as will be explained below, the Board had adopted the markups prescribed by Pub 408 Specifications at § 110.03 as reasonable to calculate the delay and disruption damages to Knorr for which we do find PennDOT liable. As a result, the Board has not made a separate award of home office overhead pursuant to Manshul or otherwise as claimed by Knorr. Just as importantly, exculpatory clauses such as this one in Section 111.02 designed to preclude or limit liability for breach are not enforceable in circumstances where the breaching party has either actively interfered with the other party's work or failed to take some action necessary for the prosecution of the other party's work. In A.G. Cullen Constr., Inc. v. State System of Higher Education, 898 A.2d 1145, 1175 (Pa. Cmwlth. 2006), the State System asserted that the Board erred in awarding delay damages because of the following clause:

> No claim for increased costs, charges, expenses, or damages of any kind, except as provided in the [g]eneral [c]onditions, shall be made by the [c]ontractor against the [State] System for any delays or hindrances from any cause whatsoever, including but not limited to strikes walkouts or work stoppages during the work. The [State] System may, however, compensate the [c]ontractor for any such delays by extending the time for completion of the work, as provided in the [c]ontract, which extensions shall constitute the exclusive remedy between the parties.

However, consistent with numerous other Pennsylvania court rulings, the Commonwealth Court stated that an exculpatory provision such as this cannot be enforced when: (1) there is an affirmative or positive interference by the owner with the contractor's work, or (2) there is a failure on the part of the owner to act in some essential matter necessary to the prosecution of the work. Id. at 1175-76; See also, Department of General Services v. Pittsburgh Building Co., 920 A.2d 973, 987 (Pa. Cmwlth. 2007) (concluding that DGS committed active interference by failing to convey a 1999 geological memorandum to plaintiff); Coatesville Contractors & Engineers, Inc. v. Borough of Ridley Park, 506 A.2d 862, 865 (Pa. 1986) (concluding that that borough interfered with plaintiff's work by failing to drain lake before work commenced); Gasparini Excavating Co. v. Pennsylvania Turnpike Commission, 187 A.2d 157, 161-62 (Pa. 1963) (concluding that commission affirmatively interfered with contractor by issuing notice to proceed when another contractor was working on site).[28]

In this case, Section 111.02 is similar to the clause considered in A.G. Cullen Constr., Inc., and the Board has found, as matters of fact, that several of PennDOT's actions and/or failures to act constituted active interference with Knorr's work on this project and caused Knorr the delays and disruptions for which it is claiming damages. These active interferences with Knorr's work were not of the type that were contemplated or could be anticipated by Knorr when it executed the Contract. Id. Therefore, PennDOT cannot be permitted to invoke Section 111.02 of the 408 Specifications as a general defense against Knorr's claims.

[28] The Board, of course, notes PennDOT's reference to Paliotta v. DOT, 750 A.2d 388 (Pa. Cmwlth. 2000) for the proposition that Section 111.02 governs delay claim damage calculations for claims against PennDOT. However, we also note that the effect of active interference on the part of PennDOT on the application of this type of exculpatory provision was neither raised or discussed at either the Board or appellate court level in Paliotta as it has been in A.G. Cullen, Pittsburgh Building, Gasparini and the other cases noted herein which we believe deal more appropriately with the type of boilerplate, non-negotiated language loaded into most Commonwealth contracts awarded pursuant to the competitive bid process.

Knorr's Self-inflicted Problems on the Project

Although the Board has found several of the problems experienced on the project by Knorr to be a result of PennDOT's making, we are also persuaded that a substantial body of evidence (including the extensive field diaries of PennDOT's employees on the project) establish that Knorr created, and must be held responsible for a portion of the delay and disruption it experienced on the project. Specifically, we find there are ample instances where Knorr's own mistakes in constructing the roadway, shoulders and adjacent structures, as well as ongoing problems with Knorr's equipment breakdowns and/or malfunctions, flawed working methods, multiple changes of supervisors and/or foremen, rework and/or other corrective procedures would have materially delayed and disrupted Knorr's progress in the Spring and into the Summer of 2000. In addition to testimony at the hearing, these problems are most succinctly summarized in Mr. Eberhardt's report at pages 78-80 and in the numerous field diary entries attached thereto. Even Mr. Rhodes, Knorr's own expert, acknowledged that Knorr contributed to its own difficulties. Accordingly, we find that an appropriate adjustment must be made to account for these problems created by Knorr itself in apportioning damages on the project.

Delay to Knorr Caused by PennDOT

Knorr claims that PennDOT's breach of contract and active interference with its work delayed Knorr on the SR28 project for a total of 116 days. These 116 days of claimed delay run for the period from August 13, 2000 (Knorr's original contract completion date extended 10 days to adjust for the late Notice to Proceed) through December 7, 2000 (the date it achieved substantial completion per PennDOT inspection). Knorr claims these 116 days of critical delay were caused by the following adverse "impacts" created by PennDOT upon the various types of work Knorr performed on the SR28 project:

Problem		Duration of Problem	
(1) Grades (throughout project)	-	3/15/00 to 4/4/00	20 days
(2) OGS Supplier	-	3/20/00 to 5/8/00	49 days
(3) Slope Repairs	-	3/22/00 to 6/26/00	96 days
(4) Box Culvert Grades	-	4/20/00 to 7/10/00	81 days
(5) Redesign (1820 to 1834)	-	5/1/00 to 5/9/00	8 days
(6) Awaiting Grades (1834 to 1842)	-	5/1/00 to 7/19/00	79 days
(7) Semi-Final Inspection	-	11/8/00 to 12/7/00	29 days

Thus, according to Knorr and Mr. Rhodes, Knorr's completion of the project was delayed for a total of 116 days by reason of the seven problem issues (and the duration of each of these problems) as noted immediately above.

Initially, the Board notes that we find Mr. Rhodes' testimony and report to be generally credible with respect to his attribution of the 116 days of total project delay to the seven problem issues (and durations of each) noted above. However, we also find that: (1) PennDOT did not violate its contract obligation by scheduling the semi-final inspection as it did, (2) the problems/delays caused by the OGS issue (for which we do find PennDOT responsible) were subsumed by the other problems identified in the Rhodes report, and (3) Knorr's own mistakes, equipment breakdowns, personnel turnover and other self-inflicted problems contributed to the delay and work inefficiencies it experienced on this project.

As a result of the foregoing, we find it appropriate to reduce the total number of delay days (116) claimed by Knorr to more accurately reflect the delay days we actually attribute to PennDOT's active interference with Knorr's work. In making this adjustment, we note, of course, that mathematical precision is not required in damage calculation, only a reasonable estimation of same is required to fairly represent the damages incurred. John F. Harkins Co. v. School District of Philadelphia, 313 Pa. Super. 425, 460 A.2d 260 (1983). Because we have found the delay and disruption caused Knorr by the OGS issue to have been subsumed by the other issues, we make no adjustment to the 116 days of delay for our removal of this issue from

the delay calculation. As for the removal of the final inspection scheduling issue, we note that this problem occurred at the tail end of the project after Knorr had requested semi-final inspection (and therefore after Knorr itself had determined its work to be substantially complete). It therefore appears to us that the delay and disruption from the other problems attributable to PennDOT and Knorr itself had effectively run their course by November 8, 2000. Accordingly, we believe it accurate to delete the 29 day wait for final inspection from the total delay period of 116 days to arrive at an interim total of 87 days of critical delay to Knorr caused by Knorr itself and PennDOT's active interference with Knorr's work on this project. Specifically, we find these 87 days of the critical delay to Knorr to be caused by A) PennDOT's: 1) multiple failures to timely provide necessary roadway grades/elevations (exclusive of the box culvert problem); 2) delay in addressing slope repair issues; 3) delay in confirming the change in construction of roadway shoulders to full-depth widening between 1820-1844; 4) expanding the width of shoulder construction (as well as full-depth widening) for 1834-1844 while failing to timely supply needed grades/elevations for same; and 5) delay in supplying correct grades/elevations for the roadway around the box culvert and B) Knorr's own self-inflicted problems described above. Further, although we acknowledge no surgically precise way to apportion the remaining 87 days of delay among these six enumerated causes, we do find that they were each of significant import. Accordingly, we hold that PennDOT's five categories of active interference with Knorr's work accounted for approximately five sixths or 83% of the delay and disruption Knorr actually experienced on the job, and Knorr's own self-inflicted problems account for the remaining one-sixth or 17%. We therefore find a total of 72 days of critical delay to Knorr on the SR28 project is fully attributable to PennDOT's active interference with Knorr's work, and the remaining 15 days are attributable to Knorr itself.

Delay Damages

Knorr's first category of claimed damages is delay damages. For the categories of Extended Supervision, Extended Equipment, and Extended Maintenance and Protection of Traffic, Knorr claims a total of $301,876.00 in delay damages based on 116 days of claimed delay. However, because we have found that PennDOT is responsible for only 72 of the 116 days of delay on the project, we find that only 62% of the damages actually incurred by Knorr is attributable to PennDOT.[29] Additionally, while we find the delay damage calculation performed by Mr. Rhodes for extended supervision, extended equipment and extended maintenance and protection of traffic costs to be generally credible and adequately substantiated, we also find that certain adjustments to these calculations are needed in order to more accurately reflect the actual damages incurred by Knorr as a result of the project delay.

To begin with, we note that Knorr added a 40% markup to the actual cost of its two supervisors employed during the delay period, on top of which it then added an additional 1.5% markup to reflect bonding costs. Mr. Rhodes explained that the 40% markup came from Section 110.03 of the 408 Specifications which, inter alia, outlines acceptable markup for various costs incurred by contractors in the performance of additional or extra work on a force account basis. Because the Board finds that Plaintiff has consistently utilized the markups provided for by PennDOT itself in Publication 408 Section 110.03 for extra work in its damage claim; and because this is a method frequently employed by both contractor and owner to do so; and because we find this is a reasonable and appropriate method to calculate an applicable markup to be applied to actual costs in order to calculate damages on the Contract, the Board will adopt these force account markups for calculating damages in this case. Having so adopted this methodology, however, the Board notes that the 40% markup allowable for additional labor costs

[29] 72 days actual / 116 days claimed = 62%

includes within that percentage not only markup for general and administrative costs, other overhead and profit, but also includes markup for bond. Accordingly, the Board will reduce Knorr's claimed extended supervision costs by the 1.5% markup included by Knorr for bonding costs and find that Knorr incurred $32,164 in extended supervision damages for the entire delay period claimed.

With regard to Knorr's extended equipment costs, we adopt the 5% markup on equipment costs specified in Pub. 408 Section 110.03 as utilized by Knorr and eliminate the bond markup of 1.5% to these equipment costs for the same reasons as noted immediately above. However, we credit the testimony of Mr. Rhodes that although the specific pieces of equipment utilized in the extended delay period are not individually listed in his report, the actual cost of this equipment (i.e. the depreciation and/or rental charge plus the cost to maintain and operate the equipment) is accurately reflected by the cost code for the specific task identified in his report's extended equipment cost listing. We do, however, eliminate the $29,581 for equipment maintenance and repair included in Mr. Rhodes listing as duplicative of the ownership and operating cost reflected in the other items listed.[30] As a result, we find that Knorr incurred a total of $113,184 in extended equipment damages for the entire delay period claimed.

With regard to Knorr's claim for extended maintenance and protection of traffic damages we find that, rather than utilize Mr. Rhodes blended markup rate of 30.15% for the mix of labor and material costs, the proper markup to these extended costs is more accurately performed by applying the 40% markup rate to the extended labor costs and the 25% markup prescribed by Section 110.03 to the additional material costs used in the MPT operation during the extended period. Additionally, we once again eliminate the markup of 1.5% for bonding costs.

[30] Mr. Malengo, PennDOT's expert, challenged the inclusion of these items on the list of extended equipment costs as improper operational costs. Mr. Rhodes himself testified that the cost of ownership and maintenance were included in the cost for the other items listed (N.T. 1051-1058). We therefore find the separate dollar amount listed for maintenance and repair cost to be duplicative.

Accordingly, we find that Knorr incurred total damages of $126,457 for the maintenance and protection of traffic for the entire delay period claimed.

As set forth above, the Board finds that Knorr actually incurred total damages for extended supervision, extended equipment costs and extended maintenance and protection of traffic during the entire 116-day delay period of $271,805. Of this total extended cost, the Board further finds that 62% of this total or $168,519 in delay damages incurred by Knorr is attributable to PennDOT's active interference with Knorr's work.

With regard to Knorr's additional claim for $101,228 in damages for extended home office overhead during the delay period, we find that Plaintiff's adoption of the markup percentages utilized in Section 110.03 specifically includes or accounts for the cost of general administrative and other overhead. Accordingly, the Board finds that Knorr's separate claim for home office overhead during the extended period is duplicative of the markup already added to the damages calculation and will not make a separate award for same.

Disruption Related Damages

Knorr also claims a total of $422,170 in disruption-related damages, consisting of $284,276 in paving and sub-base work inefficiency; $113,692 in maintenance and protection of traffic inefficiency; and $24,202 in additional excavation costs. Knorr asserts, in essence, that the same actions/inactions by PennDOT which delayed Knorr's work on the project also caused Knorr to incur substantial additional costs for disruption and work inefficiencies. According to Knorr, this active interference by PennDOT required Knorr: 1) to excavate and pave the roadway and shoulders in a piecemeal fashion, rather than in a linear and continuous manner as originally contemplated and to work in more crowded conditions; 2) to shift back and forth between paving and excavation work, all of which disrupted Knorr's planned, continuous work flow and caused inefficient construction and execution of the Contract; and 3) to provide

additional maintenance and protection of traffic resources during the original contract period. For the reasons explained above and below in more detail, the Board agrees with items 1) and 2) above and finds against Knorr with regard to the third.

Knorr first claims $284,276 in extra costs for disruption and inefficiency in its paving and sub-base work. Knorr arrives at this figure using a "measured mile" approach, a recognized method for calculating damages which compares a contractor's performance during an "impacted" period of performance to another baseline period of relatively "unimpacted" performance. Knorr used September 1, 2000 to October 31, 2000 as its baseline, unimpacted period of performance and compared it to the impacted period from May 2000 through August 2000. Knorr's work productivity was calculated by dividing the actual paving and sub-base costs for labor and equipment by the respective quantities of sub-base and paving installed during these two periods of time. We find this "measured mile" inefficiency calculation, as performed by Knorr's expert (Mr. Rhodes), to be both credible and reasonably accurate in assessing the degree of inefficiency experienced by Knorr on its sub-base and paving work, needing only appropriate adjustment for the Board's allocation of responsibility respecting the problem/issues complained of.

As noted above, Knorr asserts that many of the factors that contributed to its delay damages also contributed to its paving and sub-base work inefficiencies. Knorr emphasizes that the shoulder construction delays noted above; PennDOT's long delay in addressing the slope instability problems; and the multiple instances of incorrect or missing grades and elevations, all required Knorr to perform its work out of sequence and in a piecemeal fashion wholly different from the linear and continuous method of construction it reasonably anticipated using on this project at bid time.

The Board is in substantial agreement with Knorr that the five problems identified by the Board as having delayed Knorr largely explain the disruption to Knorr's paving sub-base work.[31] However we also find that Knorr's self-inflicted problems also contributed materially to this disruption. Accordingly, the Board apportions the cause of the inefficiency in Knorr's paving and sub-base work in the same manner as it did the delay. Thus we find that PennDOT is liable to Knorr for five-sixths (83%) of $280,075 (Knorr's claimed amount of $284,276 less the duplicative 1.5% bond cost) or $232,462, in disruption damages as a result of PennDOT's active interference to Knorr's sub-base and paving operation.

Knorr also claims disruption-related damages of $113,692 from inefficiency caused by PennDOT's interference to Knorr's maintenance and protection of traffic operation. Knorr generally asserts that, as a result of PennDOT's change to the roadway shoulder renovations between Stations 1820 to 1844, Knorr was forced to use flagmen whenever there was inadequate space for two ten-foot travel lanes for traffic during the original construction period, and that this occurred much more often and for longer periods of time than originally anticipated because PennDOT's changes precluded Knorr's planned method of construction and opportunity for maintaining two travel lanes during the roadway shoulder reconstruction. However, we agree with PennDOT on this issue. Among other things, Mr. Eberhardt, PennDOT's expert, persuasively argued that single lane traffic would have been required for either method of shoulder reconstruction and demonstrated with field diary entries that the revised shoulder renovation was accomplished in much less time than would support Knorr's claim on this issue. In short, we find that Knorr has failed to establish that the changes to the shoulder renovation complained of caused a material increase in Knorr's Maintenance and Protection of Traffic costs.

[31] We note that disallowance of the OGS issue is not accounted for in Mr. Rhodes' disruption calculation. However, we consider this immaterial since we determined that this issue was subsumed by the other problems and had no material effect on Knorr's work in any event since Knorr acquired an alternate supplier of OGS by the time it really needed same. Likewise, our elimination of the 29 days of claimed delay relating to the scheduling of the semi-final inspection has no effect or relationship to the disruption calculation.

Knorr's claim for costs for additional excavation work is based on the premise that it excavated 672.29 cubic yards of material and should have been compensated for this excavation using the Class 1B excavation rate ($45 per cubic yard) as opposed to the Class 1 excavation rate ($9 per cubic yard). This excavation was associated mostly with the full-depth widening revision that was performed from Stations 1820 to 1834. Since we have found above that the work at issue was more akin to Class 1B than Class 1, we find Knorr is entitled to the higher rate. Furthermore, because this work appears to have been done in the quantity asserted and the claim amount is not otherwise related to the several factors listed by Knorr as having caused its disruption-related damages, the Board will award Knorr the entire $24,202 requested without reduction.

Summary of Damages

The Board has made determinations that Knorr is entitled to the following damages in this case: (1) $168,519 in total delay damages; (2) $24,202 for excavation in accordance with the Class 1B excavation rate; and (3) $232,462 in disruption-related damages for paving and sub-base work. Thus, the total damages due to Knorr equals $425,183.

PennDOT's Counterclaim for Liquidated Damages

PennDOT asserts a counterclaim for $194,350 in construction engineering liquidated damages ("CELD's") in this action as well. Section 108.07(a) of the 408 Specifications, relating to liquidated damages, states in part: "For each day that any physical work remains uncompleted after the Required Completion Date, the sum per day specified in the following schedule, unless otherwise stated in the proposal, will be deducted from money due or to become due." PennDOT points out that the last day of physical work on the project was August 8, 2001, or 299 days past the required completion date of October 13, 2000. Thus, at the $650 per day rate asserted by PennDOT, its claims entitlement to a reimbursement from Knorr of $194,350.

Knorr argues that a liquidated damage provision is unenforceable if it is punitive in nature, as opposed to compensatory. It also argues that the party seeking to enforce a liquidated damages provision has the burden of showing not only that it is entitled to liquidated damages and the proper amount, but also that the liquidated damages represent a reasonable estimation of the amount of damages a claimant would actually incur. Knorr further asserts that PennDOT can not collect liquidated damages for any period for which PennDOT itself caused or contributed to a delay.

In Pennsylvania, liquidated damages clauses are enforceable provided that, at the time the parties entered into the contract, the sum agreed to is a reasonable approximation of the expected loss rather than an unlawful penalty. A.G. Cullen Constr., Inc. v. State System of Higher Education, 898 A.2d 1145, 1162 (Pa. Cmwlth. 2006). In determining whether a liquidated damages clause is an unlawful penalty, one must examine the entire contract, the parties' intentions and the facility of measuring damages or lack thereof, so as to arrive at an equitable conclusion. Com., Department of Transportation v. Interstate Contractors Supply Co., 568 A.2d 294, 295 (Pa. Cmwlth. 1990). The important idea here is that the sum assessed is a "reasonable approximation" of the generally expected loss due to the failure to complete the project on time:

> Damages for breach by either party may be liquidated in the agreement but only at an amount that is reasonable in the light of the anticipated or actual loss caused by the breach and the difficulties of proof of loss. A term fixing unreasonably large liquidated damages is unenforceable on grounds of public policy as a penalty.

A.G. Cullen Constr., Inc., 898 A.2d at 1162 (quoting Restatement (Second) of Contracts § 356(1) (1981)).

The party assessing liquidated damages has the ultimate burden of persuasion and the burden of initially showing that the contract was not completed by the agreed date and that liquidated damages were properly assessed. PCL Construction Services, Inc. v. United States, 53 Fed. Cl.

479, 484 (2002). The party may meet this burden by showing that the contract performance requirements were not substantially completed by the contract completion date and that the period for which the assessment was made was proper. Id. For several reasons, the Board will grant PennDOT its claim for construction engineering liquidated damages in this case, but in a significantly reduced amount.

Specifically, the Board finds that the $194,350 requested as construction engineering liquidated damages is an unreasonably large liquidated damages figure under the circumstances of this case, and is improperly calculated in any event. The amount represents a charge of $650 per day for the 299 days that passed from October 13, 2000[32] to August 8, 2001 the day Knorr completed all activity on the project. First of all, PennDOT calculates the amount of liquated damages beginning on October 13, 2000, while the Board has held PennDOT responsible for 72 days of delay past the original completion date of August 13, 2000 (or until October 24, 2000). Further, while we have not found PennDOT liable for the 29 days of delay claimed by Knorr for the "delay" in scheduling a semi-final inspection from the time requested by Knorr, neither do we find Knorr responsible for this period. As a result, we find that PennDOT can only properly assess Knorr for 15 days of delay between October 13, 2000 to December 7, 2000 (the date of substantial completion).[33]

Secondly, in assessing the propriety of the CELD's claimed for uncompleted work after substantial completion on December 7, 2000, it is altogether appropriate to consider what actual costs the CELD's are designed to approximate in order to determine the reasonableness of the assessments. It is the Board's understanding that CELD's are generally intended to estimate and offset the cost to PennDOT of providing inspectors on site and other personnel to oversee the

[32] PennDOT arrives at this October 13, 2000 date by using the August 13, 2000 date plus the 61 day extension it granted to Knorr pursuant to its letter of August 21, 2000. (Exhibit P-128).
[33] The 15 days of delay incurred before substantial completion for which we find Knorr, not PennDOT, responsible.

remaining work to be done on a project. In this regard, it is pertinent to note that, for the period from mid-December 2000 to mid-May 2001, a period during which Knorr did no work, the evidence shows that PennDOT agreed to allow Knorr to engage in this second Winter shutdown. Thus Knorr cannot fairly be charged for this period of "delay" in calculating a CELD amount. In fact, of the total time following substantial completion to final day of physical work (December 7, 2000 until August 8, 2001), Knorr performed only 32 days of work. Additionally, 13 days of that work were force-account items that cannot fairly be considered incomplete Contract work. The remaining work performed by Knorr after the December 7, 2000 substantial completion date consisted of some punch list work, placing of topsoil and seeding, some small adjustments to one or two sections of the roadway, and a box culvert repair. The CELD amount claimed by PennDOT bears no reasonable relationship to the cost to PennDOT of maintaining inspectors on site for 19 actual additional working days (even assuming that such inspectors were necessary on site each of the 19 days given the minimal nature of the clean-up work performed). Moreover, as to these remaining 19 days of actual Contract work, the Board has no evidence before it to contradict or counter its general five-sixths to one-sixth apportionment of responsibility for delay on this project. Accordingly, we find that, of the 19 days of Contract work actually performed by Knorr on the SR28 project after substantial completion, 16 are attributable to PennDOT and only 3 attributable to Knorr. In total then, we find it proper to assess Knorr only for the 15 days of delay attributable to Knorr before substantial completion on December 7, 2000 and the 3 days thereafter, for a total CELD assessment of $11,700.

Reconciliation of Awards and Final Judgment

Having found PennDOT liable to Knorr on its claims for the SR28 project in the total amount of $425,183 and Knorr liable to PennDOT for CELD in the amount of $11,700, we offset same and arrive at a unified judgment and award of damages in this case to Knorr of

$413,483. With prejudgment interest of 6% per annum running from July 25, 2003 (the date Knorr filed its claim with PennDOT) to the date of this Order added on ($124,045), we find for Knorr in the total amount of $537,528.

ORDER

AND NOW, this 25th day of July, 2008, **IT IS ORDERED** and **DECREED** that judgment be entered in favor of Plaintiff, Wayne Knorr, Inc. ("Knorr") against the Defendant, Commonwealth of Pennsylvania, Department of Transportation ("PennDOT"), in the sum of $537,528. This sum consists of $413,483, the amount owed to Knorr for damages incurred as a result of PennDOT's breach of contract on the SR28 project (after setoff for counterclaim) and $124,045 in prejudgment interest on that amount. In addition, Plaintiff is awarded post-judgment interest on the total outstanding judgment at the statutory rate for judgments (6% per annum) beginning on the date of this Order and continuing until the judgment is paid in full. Each party herein will bear its own costs and attorney fees.

BOARD OF CLAIMS

_____
Jeffrey F. Smith
Chief Administrative Judge

OPINION SIGNED

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Harry G. Gamble, P.E.
Engineer Member

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Andrew Sislo
Citizen Member