

BEFORE THE
MARYLAND STATE BOARD OF CONTRACT APPEALS

Appeal of GREINER)
ENGINEERING SCIENCES, INC.)

) Docket No. MSBCA 1366

Under SHA Contract No.)
A 519-060-670/W 520-005-670)

March 28, 1989

Equitable Adjustment - Jury verdict - The record reflected that Appellant, an engineering design firm, was entitled to an equitable adjustment for damages from loss of efficiency or productivity. To determine the amount of the equitable adjustment the Board used a jury verdict approach and reduced the damages claimed to compensate for deficiencies in proof of damages under Appellant's total cost approach.

Equitable Adjustment - Loss of Efficiency - Loss of efficiency may be established through the testimony of witnesses possessing special skill, knowledge or experience beyond that of the average person in the type of work alleged to have been impacted.

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OPINION BY CHAIRMAN HARRISON

This timely appeal involves a denial by the State Highway Administration (SHA) of Appellant's claim for damages arising out of performance of design services on a portion of U.S. Route 48 in Western Maryland.

Findings of Fact

1. On October 5, 1979, Appellant entered into a contract¹ (agreement) with SHA to perform final design services for a 3.86 mile portion of U.S. Route 48, east of Orleans Road to west of Bottenfield Road, in Allegany and Washington Counties, Maryland.
2. The scope of services to be provided by Appellant was divided into two phases, Phase IV and Phase V. Phase IV included all engineering services required to complete final design including bridge structures and to prepare construction contract plans, specifications and documents for bid advertise-

¹The contract contains a Disputes Clause providing for resolution of disputes by this Board's predecessor, the Maryland Department of Transportation Board of Contract Appeals. This Board has jurisdiction over the dispute pursuant to Section 25 of Chapter 775, Acts of 1980. See Kasmer Electrical Contracting, Inc., MSBCA 1065, 1 MSBCA ¶33 (1983).

ment. Phase V involved all work from advertisement of the project to opening of traffic, including review of shop drawings and any redesign during construction.

3. The basis of payment for Phase IV services is stated as "cost plus fixed fee" with various amounts payable for specific items and an overall maximum amount payable. The Phase IV payment section specifies:

The maximum amount payable to the Consultant under this Agreement, for all Phase IV services performed...may not exceed Four Hundred Twenty Four Thousand and Two Hundred Sixty Nine Dollars (\$424,269) without the express written approval of the Highway Administration.

4. For Phase V services, the Agreement sets forth similar payment limitations and states that the "maximum amount payable" to Appellant for the checking of all shop and working drawings "may not exceed Twenty Five Thousand Nine Hundred Twenty Dollars (\$25,920) without the express written approval of the Highway Administration" and for all redesign under construction services "may not exceed Three Thousand Nine Hundred Thirty Dollars (\$3,930), except where extra or additional work has been properly authorized by the Highway Administration". The maximum amount payable for all Phase V services totalled \$29,850.

5. The basis of payment section of the Agreement concludes with a paragraph entitled "Total Payment":

The total maximum amount payable to the Consultant for all services provided under this Agreement, may not exceed Four Hundred Fifty Four Thousand One Hundred Nineteen Dollars (\$454,119) except where extra or additional work has been properly authorized by the Highway Administration.

The Agreement also contained a "no-damages-for-delay" clause providing:

The Consultant agrees to prosecute the work continuously and diligently and no charges or claims for damages shall be made by him for any delays or hindrances, from any cause whatsoever during the progress of any portion of the services specified in

this Agreement. Such delays or hindrances, if any, may be compensated for by an extension of time for such reasonable period as the Department may decide. Time extensions will be granted only for excusable delays such as delays beyond the control and without the fault or negligence of the consultant.

(General Conditions at 2.).

6. The expected duration of Phase IV work was 15 months from the Notice to Proceed, with completion anticipated by March 1981. However, as discussed below, the work at issue (principally Phase IV) was not completed until sometime in the latter half of 1986.

7. An "initiation" meeting for the project was held on December 7, 1979. At this meeting and shortly afterwards, SHA directed Appellant to conduct various studies relating to changes in the scope of the original design work for the related construction project, including re-evaluating the horizontal and vertical alignment of the highway, bifurcating part of the roadway and restudying the High Germany Road alignment because of an adjacent property owner's objections. Following the Preliminary Investigation on July 22 and 23, 1980, SHA directed Appellant to prepare a detour road for the Sideling Hill Creek structure. In addition, Appellant was directed to restudy the Old National Pike profile.

8. In December, 1980, SHA directed Appellant to make estimates of cut and fill quantities and to change the roadway median width from 58 to 34 feet.

9. On January 13, 1981, SHA directed Appellant to stop work on the project except for the detour road plan because SHA was experiencing funding uncertainties and was in the process of assessing its options. Appellant resumed contract work at SHA's direction on January 30, 1981. On March 10, 1981, SHA directed Appellant to undertake cost reduction studies. As a

result of these studies SHA decided to segment construction of the project into two distinct contracts with Appellant providing design services and preparation of contract documents for both.

10. On January 5, 1982, SHA directed Appellant to stop work on everything except the right-of-way plats. This stoppage lasted until September 9, 1982.

11. Subsequently, SHA (again because of funding problems) directed Appellant to prepare plans for another construction contract; a contract under which the highway would be designed for limited access. The limited access contract plans were completed in January, 1986; Appellant ultimately providing design services for three contracts.

12. From January 17, 1981 to July 10, 1986, SHA issued five Extra Work Orders (EWOs) to compensate Appellant for the extra work performed as partially described above. Appellant developed the man-hours used or estimated to be used for the extra work, negotiated those hours with SHA and signed the EWOs. The EWOs issued to Appellant totalled \$480,843.²

13. On March 14, 1985, Appellant submitted a claim to SHA for costs over and above the original contract and EWOs due to "an inordinate number of short term and long term interruptions to the normal progress of work and other time consuming features resulting from SHA direction or decisions."

14. By January 21, 1987, the parties had negotiated most of the individual items set forth in the initial March 14, 1985 submission. The only claims remaining as of January 21, 1987 were for "Additional Drawings and Additional Effort Per Drawing".

²These EWOs were as follows:

<u>No.</u>	<u>Date</u>	<u>Amount</u>
1	1-7-81	\$ 3,710
2	7-8-82	\$319,480
3	5-22-84	\$ 67,752
4	3-29-85	\$ 83,201
5	7-10-86	\$ 6,700
Total Extra Work		\$480,843

15. Appellant calculated the additional drawings claim by subtracting the number of contract drawings it estimated (146) from the number of contract drawings it provided (255) and multiplying this by an estimated number of man-hours per drawing. This resulted in a total of 5,529 hours and a claim of \$131,128.

16. By letter dated June 9, 1987, from the Chief, Bureau of Highway Design, SHA denied Appellant's claim because the man-hour overrun based on contract drawings was "not identifiable as being the result of additional and/or extra work tasks."

17. On June 22, 1987, Appellant appealed the decision to deny its claim to the SHA Administrator.

18. By letter dated August 13, 1987, the SHA Administrator rejected Appellant's request for compensation based on additional drawing efforts. However, the Administrator's letter indicated that SHA would consider a request for compensation based on documented, auditable accounting information identifying specific tasks relating to extra work efforts.

19. Appellant submitted its final claim on September 8, 1987 in the amount of \$167,000. The final claim departed from the contract drawings overrun approach and was based on the difference between the total man-hours assigned to the original contract work and approved EWOs identifying specific tasks and the total man-hours actually expended on the project through May 29, 1986. This differential resulted in a total alleged overrun of 6,578 man-hours. Appellant claimed the entire hourly overrun resulted from adverse impact on productivity attributable to "man-hours involved in the interruptions to the normal process of preparing the contract documents and also the extensive administration". Appellant presented its claim on a "total cost"

basis because due to the alleged numerous interruptions over a long period of time "an estimate for each interruption is very difficult with our retrieval system".

20. On November 30, 1987, SHA issued a final decision denying Appellant's claim and Appellant filed an appeal with this Board on December 28, 1987.

21. Appellant, pursuant to the Board's Order on Proof of Costs, submitted reduced costs of \$151,938.31. Both parties agree that Appellant's books and records reflect an actual adjusted claim figure of \$148,859.80. While SHA does not dispute that Appellant's books and records reflect that Appellant absorbed such costs on the project, it objects to Appellant's entitlement thereto on various legal grounds.

Decision

The threshold issues before the Board are whether, as SHA argues, the no-damages-for-delay and/or the not-to-exceed clauses of the Agreement preclude the award of an equitable adjustment to Appellant. The no-damages-for-delay clause provides:

The Consultant agrees to prosecute the work continuously and diligently and no charges or claims for damages shall be made by him for any delays or hindrances, from any cause whatsoever during the progress of any portion of the services specified in this Agreement. Such delays or hindrances, if any, may be compensated for by an extension of time for such reasonable period as the Department may decide. Time extensions will be granted only for excusable delays such as delays beyond the control and without the fault or negligence of the Consultant.

(General Conditions at 2.).

SHA argues that Appellant's claim is for damages resulting from "delays or hindrances", and thus it is barred by the clause. Appellant acknowledges that no-damages-for-delay clauses are enforceable in the State of Maryland. See Christhilf v. Mayor and City Council of Baltimore, 152 Md. 204 (1927).

Appellant, however, contends that the damages it incurred were not "delay damages" but "disruption damages" and seeks to distinguish damages for "delays or hindrances" and "disruption damages". According to Appellant, "delay damages" consist of damages such as extended home office and field overhead and the loss of use of capital which result from extended job performance caused by periods of postponement or slowing of work. Such damages according to Appellant are to be distinguished from "disruption damages", which it asserts are not intended to redress the loss from being unable to work, but to compensate for the damages suffered from actions which make the work more difficult and expensive than anticipated or than it should have been. Both Appellant and SHA cite Lichter v. Mellon-Stuart Co., 196 F. Supp. 149 (W.D. Pa. 1961) which interpreted "delay" to include "disruptions and interferences which obstructed and hindered and thus lengthened the time of performance." Appellant argues that this definition does not encompass its claim since it seeks to recover costs which allegedly would have been incurred even if the contract was performed within its scheduled completion date.

In Cosinno Civetta Construction Corp. v. City of New York, 502 N.Y.S. 2d 681 (Ct. App. 1986) the plaintiffs (as does Appellant here) sought to distinguish damages resulting from a delay of the project beyond the scheduled completion date from those for increased costs in labor, materials and equipment occurring prior to the expiration of the contract period asserting that the no-damages-for-delay clause did not bar the latter category of claims. The Court observed:

All delay damage claims seek compensation for increased costs, however, whether the costs result because it takes longer to complete the project or because overtime or additional costs are expended in an effort to complete the work on time. It is of no consequence that the obstruction, whatever its cause, occurs during the term of the contract or afterwards or whether it disrupts the contractor's anticipated

manner of performance or extends his time for completion. The claims are claims for delay and the exculpatory clause was drafted and included in the contract to bar them.

502 N.Y.S. 2d 681 at p. 689.

In any event, resolving in its favor any doubt as to whether the term "delay" encompasses the damages Appellant seeks, Appellant's claim nevertheless fits squarely within the definition of "hindrance" (as contained in the instant clause). In B.J. Harland Electrical Co. v. Granger Brothers, 510 N.E. 2d 765 (Mass. App. Ct. 1987) a general contractor's sequencing of the work on a public work adversely affected a subcontractor's performance and the subcontractor filed a claim based on loss of efficiency and reduced productivity. A mandatory public contract provision in the prime contract with the State agency concerned (incorporated by reference in the subcontract) provided that a contractor would not be entitled to damages on account of "any hindrances or delays". The subcontractor argued, and the trial court concurred, that it was not suing for delay, but instead for lost productivity due to the contractor's failure to provide timely access to the site and its failure to coordinate the work properly. The Massachusetts Appeals Court, however, concluded that the failures enumerated by the subcontractor, i.e., "increased cost of performing its work piecemeal, out-of-sequence and in winter weather", if not delays, must be considered "hindrances", and the disclaimer expressly applied to hindrances. Similarly, we conclude that the "hindrances" portion of this Agreement's no-damages-for-delay clause is applicable to Appellant's claim for compensation. See also City of Houston v. R. F. Ball Construction Co., 570 S.W.2d 75 (Tex. Ct. App. 1978).

Appellant next argues that although no-damages-for-delay clauses purport to preclude damages for all delays resulting from any cause whatsoever, there have been a number of exceptions carved out. Appellant asserts, citing Cosinno Civetta, supra, that even with such a clause, damages may be recovered for delay which was:

- (1) caused by the bad faith or willful, malicious, or grossly negligent conduct of the party seeking enforcement of the clause;
- (2) not contemplated by the parties;
- (3) so unreasonable that it constitutes an intentional abandonment of the contract by the party seeking enforcement of the clause; or
- (4) the result of that party's breach of a fundamental obligation of the contract.

Cosinno Civetta, supra at 686.

In addition, Appellant notes that it has been held that such clauses will not be enforced if they are waived by words or conduct, or are ambiguous when read together with other provisions of the contract. See Chicago College of Osteopathic Medicine v. George A. Fuller Co., 776 F.2d 198 (7th Cir. 1985) (prime contractor found to have orally waived the clause); Shintech, Inc. v. Group Constructors, Inc., 688 S.W.2d 144 (Tex. App. 1985) (The contract also incorporated by reference the contractor's proposal containing a clause that allowed the contractor to recover any "undue expense" resulting from owner-caused delays. This clause and the no-damages-for-delay-clause were found in irreconcilable conflict and the "No Damages" clause was not enforced).

Appellant contends that the delay on this project was not contemplated by the parties at the time of entering into the Agreement and therefore it falls within the exception to application of the clause for delay not contemplated by the parties. The record clearly reflects that neither Appellant nor

SHA contemplated a delay of almost six years at the time the Agreement with an estimated duration of 15 months was entered into. At the hearing, Stephen Foster, a project engineer with SHA, testified that he had seen contracts of 2-1/2 to 3 years estimated duration extend to 4 or 5 years, i.e. at most an increase of 2-1/2 times the original estimate. (Tr. 208). From this testimony and other evidence of record we infer that an increase in the contract duration of five times the original estimate is unusual and not foreseeable by either party.

We do not believe the no-damages-for-delay clause was intended by SHA to be read to deny its contractor reimbursement for such unforeseeable delay. As the Court stated in John E. Green Plumbing & Heating Co., v. Turner Construction Co., 500 F. Supp. 910, 912 (E.D. Mich. 1980) citing E.C. Nolan Co. v. Michigan, 227 N.W. 2d 323 (1975):

A contractor can take a reasonably short delay into consideration when computing its bid on a project, but how could a contractor be expected to submit a competitive bid if it had to include in that bid expenses for a delay that could be of infinite duration? We submit that a contractor could only complete a competitive bid if it were of the opinion that it would be reimbursed for additional expenses caused by unreasonable delays.

We finally observe that, whether or not unforeseeable delay precludes enforcement of the no-damages-for-delay clause, it should be viewed as unconscionable to permit SHA, having for its own purposes imposed stoppages and required extra work extending the anticipated contract time fivefold, to rely on the no-damages-for-delay clause to deny reimbursement to Appellant.

We next examine the not-to-exceed clauses of the Agreement which provide that: "the maximum amount payable to the consultant under this Agreement, for all [Phase IV and Phase V] services performed...may not exceed...; and that: "The total maximum amount payable to the consultant

for all services provided under this Agreement, may not exceed...except where extra or additional work has been properly authorized by the Highway Administration." SHA argues that these clauses preclude award of an equitable adjustment in this case because Appellant cannot identify any extra or additional work authorized by SHA for which it has not been paid.

In its post-hearing reply brief Appellant indicates that it agrees that the not-to-exceed provision provides a legal barrier to recovery unless it is increased by virtue of the claim being deemed extra or additional work as defined under the contract or unless the State is estopped from relying upon the provision.³ Appellant, however, argues that its claim is for additional work of a kind not contemplated by the not-to-exceed clauses and alternatively that SHA is estopped from relying on these clauses.

Additional work is defined in the Agreement as "any services or actions required of the Consultant, which are quantitatively more of the same task functions or services set forth in the scope of work...." Appellant labels its claim as one involving additional work since performance of its basic services took more time because of the adverse impact of the necessity to stop and start the original work numerous times as a result of SHA's actions, and that, as such, the work literally is "quantitatively more of the same task functions or services set forth in the scope of work". While acknowledging that the literal definition of additional work as it appears in the Agreement would cover its claim, Appellant argues persuasively that the not-to-exceed clauses were not intended to preclude a claim for damages in excess of the not-to-exceed threshold based on loss of efficiency flowing from numerous work stoppages, EWO's and a fivefold increase in time of performance.

³Both parties agree that Appellant's claim is not for "extra work" and that Appellant has been compensated for "extra work" performed in the five EWO's issued for this project.

We also are impressed with Appellant's alternative argument that SHA is estopped from relying on the not-to-exceed clauses in the face of SHA imposed stoppages and extra [or "additional"] work extending the contract time fivefold. Estoppel may arise when actions are taken to the detriment of one party to a contract who relies thereon even if the offended party is a private one and the offender a public agency. See Dana Corp. v. United States, 200 Ct. Cl. 200, 219-221 (1972). Here the negotiation by SHA of additional compensation for "extra work" on five separate occasions from January 7, 1981 to July 10, 1986 may well have induced Appellant to continue to perform in the belief that damages due to cumulative inefficiencies caused by delay, changes and stoppages attendant to the extra work and project generally that could not be precisely anticipated, quantified nor accounted for in the EWO then being negotiated would be ultimately considered on the merits.⁴ Thus we conclude for all of the foregoing reasons that SHA, as in the case of the no-damages-for-delay clauses, may not rely on the not-to-exceed clauses to deny Appellant's claim where SHA has for its own purposes imposed work stoppages and required extra work extending the anticipated contract performance time fivefold.

⁴Indeed, the record reflects that SHA initially was disposed to honor Appellant's claim (as submitted on March 14, 1985) for 5,529 man hours at a dollar figure of \$131,128. SHA audited Appellant's books and records on the claimed 5,529 hours, verified that Appellant had expended the hours claimed and indicated that it would begin processing an extra work order. Nevertheless SHA ultimately determined that it would not pay Appellant for any additional man-hours lost on the original work due to adverse impact of the extra or additional (i.e. changed) work and SHA imposed stoppages to the project. This is so according to SHA because these hours were expended in performing original contract work and not extra or additional work. SHA in negotiating compensation for additional or extra work only pays for hours associated with that specific work and will not include, because of the no-damages-for-delay clause, costs incurred by the particular firm involved for loss of efficiency on the original work due to having to stop it and start it again in order to accomplish the additional or extra work (i.e. the change(s)). (Tr. 161-187).

Having determined that the not-to-exceed and no-damages-for-delay clauses may not be used to defeat Appellant's claim we turn to consideration of the claim on its merits. Appellant seeks to prove its inefficiency damages on a total cost basis. Appellant arrived at its alleged damages by subtracting the sum of the estimated total man-hours it assigned to the original contract work and man-hours assigned to the extra work orders and specific task orders from the total man-hours actually expended on the entire project which resulted in an overrun of 6,578 man-hours. Appellant then multiplied those hours by the applicable hourly costs resulting in an amount (above the contract upset limit) of \$148,859.80 in unreimbursed costs.⁵ As noted, the SHA agrees with, or at least does not dispute, that Appellant's books and records reflect accurately its claim figure of \$148,859.80 derived by multiplying the number of hours on the project that exceeded the original estimate plus extra work and task orders (i.e. 6,578) by the applicable costs per hour. However, SHA contends that Appellant has not met its burden of proof to show that these costs or any portion of them were attributable to the actions of SHA on this contract as distinct from some other cause or causes. In particular, SHA asserts that the record lacks alleged requisite expert testimony concerning specific losses of efficiency in man-hours based upon Appellant's books and records.

We observed in Traylor Brothers & Associates, MSBCA 1028, 1 MSBCA ¶86 (1984) at p. 19 quoting from Wunderlich Contracting Company v. United States, 173 Ct. Cl. 180, 199 (1965) that:

A claimant need not prove his damages with absolute certainty or mathematical exactitude. It is sufficient if he furnishes the court with a reasonable basis for computation, even though the result is only approximate. Yet this leniency as to the actual mechanics of computation does not relieve the contractor of his

⁵These costs were comprised of actual salaries paid to productive technical personnel and payroll burden.

essential burden of establishing the fundamental facts of liability, causation, and resultant injury (citations omitted).

The essence of the Appellant's claim of inefficiency is predicated on loss of productivity caused by its having to stop and start the original work and assign and reassign personnel thereto numerous times over a period of six years to accommodate the actions and inactions of SHA. Loss of productivity cannot always be proven by books and records. Often it must be proven by the opinion of experts of sufficient credibility to permit a reasonable approximation of the degree of lost efficiency. Traylor Brothers & Associates, supra at p. 21.

Expert testimony, the receipt of which is largely discretionary, consists of the testimony of a person concerning matters involving special skill, knowledge or experience which the fact finder (in this case the Board) requires or in its discretion believes would be useful in making a determination. See Troja v. Black & Decker Mfg. Co., 62 Md.App. 101, 110 (1985), cert. denied, 303 Md. 471 (1985). What testimony then that may be considered "expert" was presented by Appellant from which the Board could determine the extent of the equitable adjustment or damages?

Mr. Ernest Rehmeier, an employee of Wallace Montgomery and Associates at the time of the hearing testified for Appellant. Mr. Rehmeier was previously employed by Appellant as a project director and at all relevant times had responsibility for the instant project. Mr. Rehmeier has been a civil engineer for over 30 years, is registered in three states and at the commencement of the instant project had over 21 years of highway design experience. He testified that in his opinion the number of man-days (and man-hours) estimated for the project for which he was responsible was realistic based on a comparison with other similar jobs in the area, Appellant's

familiarity with the specific area and other very similar mountain highway work being performed by Appellant in West Virginia at the time it submitted its proposal.

Mr. James McCummings, an employee of Appellant for 38 years, and a registered professional engineer licensed in six states also testified for Appellant. Mr. McCummings has some 25 years of experience with bridge design and has designed several hundred bridges ranging in size and complexity from the Chesapeake Bay Bridge, a large suspension type bridge, to small highway overpasses. At the time of the hearing he was Appellant's chief project director for bridge projects. Mr. McCummings testified that he was comfortable with Appellant's man-hour estimate as it related both to design of bridge structures on the project and overall project man-hours.

As a representative example of how loss of productivity would occur on the original project work, Mr. McCummings testified as follows:

Q Now, is this change [pause] are we talking about just a minor sort of change or was it significant? [change from box culverts to metal type culverts]

A It was a very significant change, changes [to] span arrangement, I would call them.

Q Now, is this typical of the changes that you were encountering on this project?

A This would be somewhat typical. This was more important, I think, the span arrangement changes. I think the other changes were changes that really stopped us from certain work, but the change in span arrangements is a very major change.

* * *

Q Now you've been paid for the actual work you did on that change. But by virtue of the change, what happened to the ongoing work?

A Well, we had to stop. We had to stop that type of work, and then we eventually picked it up again with a new arrangement and began to proceed with the design.

Q Were you, during the course of this period of time, I guess in '79 to '84, that is a five-year period, were you always able to find the same people that had been working on the project when you picked it up again? Or did you have to break in new people?

A The people that worked on the job I think in early '79 and '80 were not necessarily the same people who worked in '83.

Q And when during a design of a single structure, to change horses in the middle of the stream, so to speak, what's that do to your productivity?

A It certainly affects your productivity in a negative sense.

(Tr. pp. 30-31).

Mr. Phillip Grill, a project director with Appellant at the time of the hearing (and project engineer on the instant project) testified as to specific causes of inefficiency. Mr. Grill is a registered professional engineer with 42 years of experience working as an employee of Appellant starting as a draftsman, and progressing up through Appellant's organization from engineer to project engineer to project director. Like Mr. McCummings and Mr. Rehmeier, Mr. Grill was of the opinion that sufficient man-hours⁶ were allocated for the original work; and all three characterized the original project as only an average size project. These witnesses also had checked the reasonableness of the man-hour estimate for the original work by performing man-hour studies on a per drawing basis and comparing the results with other similar work and standards set by public agencies.

⁶ Appellant candidly acknowledges that if its original man-hour estimate was incorrect then to the extent that it was incorrect the claim must fail. Appellant's man-hour estimate of 19,976 man-hours was 5,736 hours lower than that indicated in the second ranked proposal and 8,472 hours lower than SHA's estimate of 28,448. This disparity alone is not necessarily evidence of a poor estimate on the part of the Appellant. As noted above, Appellant based its estimate on similar work done in this area. Appellant had worked on a portion of I-70 in Western Maryland and Appellant also had the benefit of some work it was doing concurrently in West Virginia in similar mountainous terrain. We also note that Appellant was selected in a competitive procurement where its technical proposal was the highest rated by a wide margin. Rule 4 File - Board of Public Works Agenda Item. Presumably, the evaluation of its technical proposal encompassed the man-hour estimate.

Mr. Grill, as indicated, testified in some detail concerning Appellant's claim of loss of inefficiency or productivity; i.e., the requirement to expend additional man-hours beyond that estimated for the original work in order to complete such work as a result of having to start and stop the original work, reassign people and put such work aside in order to react to actual and constructive changes (including work stoppages) over a period of some six years (in a project estimated to take 15 months) to accomplish the additional or extra work encompassed by the changes.

Mr. Grill's testimony followed a memorandum he had prepared for the hearing which in turn follows the 35 page appendix to the Appellant's claim as submitted on March 14, 1985. (Appendix to Tab A, Rule 4 File). That extended appendix, which is in evidence, lists the significant events of the project from its inception through July 1984.

The appendix is then followed by a 3 page document (also in evidence) which lists 51 events in the 1980-1984 period including work stoppages and extra work orders "which impacted the normal progress or development of the original concept" Mr. Grill referred to 6 of the 51 events in his testimony as examples of what occurred. (Tr. 40-81). His testimony on one event serves to illustrate the basis of the claim and is representative of the others.

"We were, just a short time later in January [1980], latter part of January, we were asked to study this portion down here to eliminate the bifurcation. In other words, just dualize the road so that it follows one, both east and westbound roadways follow one common alignment and crossed the Sideling Hill Road bridge structure here in this area. We were asked to investigate that bifurcation. In February, this is all 1980, in February, we started on interchange layouts. But it became evident, one of the property owners, Mr. [X] who owns this property right here, started raising questions * * * [A]nd as a result of his objections to this piece of High Germany Road being relocated over here on his property, we were asked to restudy the whole area, including the realignment of High Germany Road and the interchange layout. So that went on for a period of a few months or so.

Q By the way, let me, I'm going to interject as we go along, were you give, were you paid for your work as extra work for doing that study?

A We were.

Q But when you went to that study, what happened to the work that was going, ongoing for the entire project?

A Well, we had, we had to relocate our forces, so to speak or take whatever personnel that we had involved on the 48 job and whatever personnel it took to develop these interchange layouts and whatever studies cost, studies that we had to do, that would have caused us to change people back and forth. And then ultimately after this was finalized, we were then able to put them back onto the mainline efforts. We were at this time because we knew that there was a PI, PI is a preliminary field investigation. We were trying to develop plans for that".

(Tr. 45-46)

While Messers. Rehmeier, McCummings and Grill were not offered as experts, SHA made no serious effort to challenge their credentials or testimony,⁷ and we acknowledge their obvious expertise in designing projects such as the instant one.

SHA next argues, however, that a claim based on loss of efficiency or productivity may only be established by the testimony of an expert in inefficiency claims. We find, however, that inefficiency may be established through the testimony of witnesses (whether formally qualified and accepted by the Board as experts or not) possessing special skill, knowledge or experience beyond that of the average person in the type of work alleged to have

⁷ Rebuttal testimony, such as it was, consisted of the testimony of Mr. Kenneth Shelton, Mr. Steve Kouroupis and Mr. Stephen Foster, all SHA employees. Mr. Shelton testified concerning the fiscal mechanics of SHA's payment of monies due A&E contractors. Mr. Kouroupis, Chief of Highway Design in the SHA Bureau of Consulting Services, testified basically as to his understanding of the mechanics of an extra work order and what he believed was covered thereby. Mr. Foster is a high school graduate who became project engineer for this project in December 1985. He does not have an engineering degree nor has he taken a State examination for registration. Mr. Foster testified somewhat equivocally that Appellant's original manhour estimate may have been low.

been impacted (in this case architectural and engineering work). Compare Luria Bros. & Co. v. United States, 177 Ct. Cl. 676, 694-695 (1966); Havens Steel Co. v. Randolph Engineering Co., 613 F. Supp. 514 (D.C. Mo. 1985).⁸

In any event, we find the testimony of Appellant's witnesses to be credible and establishing that Appellant (1) submitted a reasonable estimate of man-hours for the original work; (2) the estimate of 15 months to complete the original work was realistic; (3) the work as originally proposed was not particularly complex and the project was only of average size; (4) the progress of the original work was adversely impacted by the requirement to stop and start such work numerous times in order to accommodate extra or additional work requirements and as a result of work stoppages and personnel disruption; (5) Appellant was paid for the extra or additional work and (6) Appellant was not paid for the additional hours lost due to the adverse impact on the original work of the extra or additional work and work stoppages.

As noted, Appellant's claim is calculated using a total cost approach. Appellant multiplied its cost per hour times the difference between the estimated number of hours for the original work and extra work and the total number of hours expended on the project assuming that the number of additional hours represented by this differential were all due to inefficiency in completion of the original work caused by SHA's actions. However, Appellant candidly admits that:

Appellant did not undertake the task, which would have been monumental, to go back through a project lasting over six years and involving tens of thousands of manhours to attempt to assign to the hundreds of contract activities their allocable portion of manhours and then make studies to determine the inefficiencies caused by each of the 51 impact items.

⁸SHA's argument that expert testimony from an expert in efficiency claims is required is based on Havens Steel (and Luria Bros. which it cites). Neither case supports SHA's proposition and focus instead on the quality of the testimony presented.

If [Appellant] had invested the thousands of dollars to perform that task ... [Appellant] may have been able to add up the inefficient hours. There is a substantial probability that the total would not equal exactly 6,578 manhours, the amount now claimed. It would have been maybe a little more, maybe a little less, but absent any contrary credible testimony from the State or any challenge to the testimony from [Appellant] the cost of performing the task far outweighs any benefit to the State, [Appellant] or justice.

(Appellant's Post Hearing Reply Brief at pp. 8-9).

Despite such admission that its claim may not be mathematically precise, we find that Appellant is entitled to an equitable adjustment. It has established that it suffered a loss as a result of SHA's actions. It has not quantified precisely the actual number of additional hours required to complete the original work. It has merely estimated (through its witnesses) that all the hours claimed were attributable to inefficiency caused by SHA. SHA on the other hand argues that such estimate by Appellant's witnesses is not reliable and that therefore the entire claim must fail. To some degree this case parallels Luria Bros. & Co. v. United States, supra. There the Court of Claims allowed in part an inefficiency claim for damages for three periods of alleged loss of productivity of labor on the job. The court's determination of the claim was based on unrebutted testimony concerning estimates of the percentage loss of productivity by a former employee (Crawford) who was the plaintiff's chief of construction at the time the claim arose (although in the employ of another contractor at the time of his testimony). The Court stated:

Crawford's testimony is unrebutted. Defendant out of whose pocket the money must come to pay the large sum testified to by him, did not undertake to discredit his testimony, and so, while it is the sacred duty of this court to protect the Government from unrighteous demands as well as to protect the citizen from imposition by the Government, we cannot wholly reject this witness's testimony on the question of amount of damage.

* * *

Notwithstanding the fact that Crawford's estimates regarding the other three periods are unrebutted, we cannot ignore the fact that the percentages testified to were merely estimates based upon his observation and experience. Furthermore, his estimates are much higher than those testified to in other cases in which the conditions were not materially different from those present here. Taking these things into consideration and in view of the fact that no comparative data, no standards, and no corroboration support his testimony, we are constrained to reduce his estimates based on the record as a whole and the court's knowledge and experience in such cases to 20 percent, [10 percent and 10 percent down from 33-1/3 percent, 20 percent and 20 percent]....

Luria Bros. at pp. 696-698.⁹

See also Corman Construction, Inc., MSBCA 1254, 2 MSBCA ____ (1989), Slip Opinion at p. 37; Northbridge Electronics, Inc. v. U.S., 195 Ct. Cl. 453, 462, 444 F. 2d 1124, 1129 (1971); Story Parchment Co. v. Paterson Co., 282 U.S. 555, 561-563 (1931).

This Board is empowered to resolve contract disputes and award equitable adjustments to make a contractor whole. In measuring the loss suffered by a contractor, this Board has upon occasion applied a jury verdict approach to the determination of an equitable adjustment. In so doing we attempt to arrive at an amount that is fair to the contractor and the government.¹⁰ As we have noted, in Luria Bros., supra, the Court of Claims

⁹The Court of Claims noted the following concerning Mr. Crawford's value as a witness. "Mr. Crawford had graduated as a civil engineer from Columbia University in 1924, since which time he had been engaged in both heavy and building construction work. He was a competent witness, well-qualified to express an opinion on the loss of productivity of the labor." Luria Bros. at pp. 694-695. We draw similar conclusions concerning Appellant's witnesses herein.

¹⁰As the Board observed in Granite Construction Co., MDOT 1014, 1 MSBCA 166 (1983) at page 34:

The process by which a judge or a Board determines this fair and reasonable approximation [of damages] is referred to as the jury verdict approach. It requires that the trier of fact:

".. . weight the probative value of the various estimates that are placed into evidence and arrive at a judgment as to the amount of the equitable adjustment that should be given in view of the conflicting

reduced the amount sought because the estimates of the contractor's witness (Crawford) as to the percentage degree of inefficiency was not supported by comparative data, equivalent standards or corroborative testimony. Here the opinion testimony of Appellant's three witnesses concluding that all additional hours must have been due to inefficiency in completing original work because of SHA's imposition of extra or additional work and work stoppages rather than some other cause suffers to a lesser degree from the same defects; i.e., their opinion (respecting damages) is not supported by comparative data, equivalent standards or corroborative testimony. In other words, we must rely entirely on the estimate as provided by present and former employees of Appellant that all additional hours expended were due to inefficiencies in prosecution of the original work caused by the actions of SHA without any oral or written comparisons to other projects in which an engineering design firm experienced somewhat similar difficulties. Appellant admits that its total cost approach is probably not error free. The testimony of its witnesses fails to address in any detail activity on the project subsequent to the last of the 51 listed events in July 1984 through the filing of its initial claim in March 1985 and thereafter through project completion. Given the natural inclination of Appellant's witnesses to lay the blame for all inefficiency at SHA's doorstep, its admission of possible overstatement of inefficient manhours and the generalized nature of its proof, we conclude that Appellant has somewhat overstated its case. Thus, through application of the jury

testimony and proof that has been introduced. In performing this task of weighing the evidence, they see themselves functioning in the role of a jury arriving at a verdict, and this does appear to be a relatively accurate reflection of the process that occurs.

R. Nash, "Government Contract Changes," p. 441 (1975); see also S.W. Electronics & Manufacturing Corp. v United States, 228 Ct.Cl. 333, 655 F.2d 1078 (1981); Dyer & Dyer, Inc., ENGBCA 3999, 80-2 BCA ¶14563; Calif. Shipbuilding & Dry Dock Co., ASBCA No. 21394, 78-1 BCA ¶13168.

verdict approach, we shall reduce by 25% the number of hours claimed by Appellant in its total cost approach, reducing thereby its claimed equitable adjustment by a like percentage to \$111,644.85 ($\$148,859.80 \times 25\% = 37,214.95$; $\$148,859.80 - \$37,214.95 = \$111,644.85$).

Pursuant to the provisions of Section 15-222, Division II, State Finance and Procurement Article we award (in the Board's discretion) predecision interest at the prescribed rate from the date of the final action by SHA on the claim, November 30, 1987, a date for the commencement of predecision interest we find to be fair and reasonable given the record before us.

To the foregoing extent the appeal is sustained.

