BEFORE THE MARYLAND DEPARTMENT OF TRANSPORTATION BOARD OF CONTRACT APPEALS

Appeal of CALVERT GENERAL CONTRACTORS CORP.

Docket No. MDOT 1004

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Under SAA Contract No. 124

March 4, 1981

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Breach of Contract -- By awarding a contract (for the construction of an elevated roadway), the performance of which would necessarily prevent a pre-existing contract from being performed as-bid and planned, the SAA breached the implied obligation, in this pre-existing contract, not to prevent or hinder performance of the other party.

Assumption of Risk — An SAA contractor did not assume the risk that its work would be hindered or prevented by subsequent SAA contracts where such interference was not foreseeable at the time of bid.

<u>Notice</u> — Where an SAA contract mandated that notice of a claim for damages be submitted by a contractor within five (5) days after additional costs were incurred and, further, that a detailed statement of the claim be submitted by the fifteenth (15th) day of the calendar month succeeding the incurrence of additional costs, a contractor was found to have satisfied this requirement by submitting its notice immediately prior to incurring costs and filing a detailed statement of claim during performance of the disputed work.

<u>Mitigation of Damages</u> — The SAA had the burden of proving the extent to which damages would have been diminished by an alternate procedure.

<u>Damages</u> — A contractor was entitled to the difference between the reasonable actual costs of erecting a space frame and the reasonable as-planned costs. In determining the reasonable actual costs of performance, historical costs were accepted by the Board. Estimates and expert testimony provided an adequate basis to determine the reasonable as-planned cost.

<u>Indirect Costs</u> — Where the contractor failed to show that its allocable fixed indirect costs either were increased or underabsorbed during the original contract performance period, it was not entitled to such costs as part of its damages.

<u>Indirect Costs</u> — Where a contractor's performance period was extended as a result of the SAA's breach of contract, both fixed and variable overhead costs were recoverable in the form of damages.

<u>Predecision Interest</u> — Where a contractor incurred additional expense due to an SAA breach, the Board awarded predecision interest, as an element of damages, in order to provide as fully as possible that the contractor was made whole.

APPEARANCES FOR THE APPELLANT:

APPEARANCES FOR THE RESPONDENT:

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OPINION BY CHAIRMAN BAKER

This is a timely appeal from the State Aviation Administrator's decision dated May 23, 1979 denying Appellant's request to be additionally compensated for the assembly and erection of a space frame structure in a manner different than contemplated at the time of bid. Appellant contends that it was required to alter its planned erection procedure due to the unanticipated award of a subsequent SAA contract calling for the construction of an elevated roadway in the immediate vicinity of the space frame work. Both the issues of entitlement and quantum are to be resolved herein.

FINDINGS OF FACT

Entitlement

I.

A. Airport Expansion Program

In the late 1960's, planning studies indicated that projected air traffic growth in the Baltimore corridor would necessitate enlargement of existing airport facilities to service prospective demand through the year 1990. Consequently, in 1969, the then Governor of Maryland created and commissioned the Friendship International Airport Authority (Authority) to develop and implement an airport development plan. One of the initial decisions made by this Authority was to expand the existing Friendship International Airport¹ rather than construct an entirely new facility. This would preserve the use of existing runways and taxiways and thus minimize costs. It was further decided to maintain terminal operations during the construction program.

With these broad criteria established, the Authority selected a general design consultant to prepare both an initial concept plan and the detailed expansion

¹Now Baltimore-Washington International Airport (BWI).

design. This consultant, Friendship Associates, 2 later entered into a contract for this work with the State Aviation Administration (SAA), the agency which became responsible for airport operations upon the purchase of Friendship Airport by the State of Maryland in 1972.

Friendship Associates recommended that the existing terminal be renovated for use as offices, shops, passenger loading gates and baggage facilities. A two-level addition also was suggested for placement of the airline ticket counters and baggage claim areas. Roadways were to be constructed to service both levels of this addition. The architectural treatment of the terminal addition featured a glass enclosed structure, with roof panels resting on a space frame which, in turn, was to be supported principally by eleven concrete towers spaced at 110 foot intervals throughout the length of the new facility.

After reviewing and accepting this conceptual plan, the SAA elected to divide the project into segments, each of which would be constructed under a separate contract. The following of these contracts are considered to be most pertinent to this dispute:

> 1. Contract #127 was issued by the SAA to Calvert General Contractors (Appellant) for construction of the south terminal expansion including five towers for support of the space frame. This contract was bid on February 13, 1976 and a notice to proceed was issued on April 6, 1976.

> 2. Contract #127-A was issued by the SAA to R. S. Noonan for construction of the north terminal expansion including five towers upon which the space frame would rest. This contract was bid on April 5, 1976 and a notice to proceed was issued on or about June 1, 1976.

3. Contract #128-C was issued by the SAA to Calvert General Contractors for the construction of the central terminal including one tower support for the space frame. This contract was bid on October 27, 1976 and a notice to proceed was issued on January 20, 1977.

4. Contract #124, the subject of this dispute, was issued by the SAA to Calvert General Contractors for the design, fabrication and erection of the space frame and will be discussed in detail hereafter.

5. Contract #123-B was issued by the SAA to Calvert General Contractors for the construction of an elevated roadway linking the airport access roads to the upper concourse of the north and south terminals.

 2 A joint venture consisting of the architectural/engineering firms of Howard, Needles, Tammen & Bergendoff and Ewell Bomhardt & Associates, as well as a Baltimore architectural firm, Peterson & Brickbauer. 6. Contract #123-H was issued by the SAA to Calvert General Contractors for the construction of the elevated roadway in front of the central terminal.

The geographical relationship among these major elements of the work is depicted by the following project plan:

North Terminal Central Central Terminal Central Centra

In order to administer the construction of this project on a daily basis, the SAA, in August 1974, retained the joint venture of Ralph M. Parsons Co. and Baltimore Contractors, Inc., to serve as Construction Manager. The Construction Manager also was required to assist in the preparation of bid packages, develop a project performance schedule using critical path methodology (CPM), coordinate and integrate the design schedule with construction schedules, and conduct pre-award surveys of successful bidders to ______sure that they were responsible.

B. <u>Award of SAA Contract #124 for the Design, Fabrication and</u> Erection of Space Frame

In February 1975 the SAA issued an invitation for bids (IFB) on Contract #124 for the design, fabrication and erection of the space frame structure. At this time Mr. Rudolph Linder, President of Linder Steel Erection Co. (Linder), learned of this project and discussed it with Mr. John McKinney, the SAA Construction Manager. Mr. McKinney recommended that Mr. Linder contact the Mero Company of Germany to obtain engineering and pricing data on a space frame system. In March 1975, Mr. Linder visited the Mero Company and was referred to an American affiliate for contractual purposes. Pricing information then was obtained and an estimate was prepared in the expectation of submitting a bid. Concurrent with these events, Mr. McKinney apprised Mr. Linder of a French fabricator, by the name of Cotecno, who also specialized in space frame structures. Mr. McKinney further arranged for Mr. Linder to meet in France with an architect who was familiar with the Cotecno system and possessed a working relationship with this fabricator. Mr. Linder was favorably impressed with the Cotecno system and returned home, two days before bid, convinced that this system was superior to the Mero space frame.

Mr. Linder however did not possess sufficient assets to bid the work as a prime contractor and thus discussed the project with Mr. J. Thomas Scrivener, President of Calvert General Contractors. Mr. Scrivener and his staff then met with a representative of the French architect and subsequently agreed to participate in the venture as prime contractor. On April 8, 1975 a verbal price quotation was obtained from Cotecno for the design and fabrication of the structure and Messrs. Linder and Scrivener prepared a bid, submitting it on April 9, 1975. Appellant's bid in the amount of \$1,842,124.00 was determined to be low, a contract subsequently was awarded, and on August 4, 1975, a notice to proceed was issued. While no formal subcontract was entered into, Linder agreed to perform the erection work at a price of \$410,000.

C. Planned Method of Performance

Paragraph 3-10 of the contract Specifications required each bidder to furnish with its bid a list of all equipment which it intended to use on the project together with "...a complete description, including diagrams if necessary, of the proposed methods of erection and equipment to be utilized for the assembly and/or erection of the Space Structure." Appellant's erection plan, submitted with its low bid and elaborated on in its letter to the Construction Manager dated June 2, 1975, was as follows:

> "Our erection scheme is fundamentally simple and clean, completely eliminating the necessity of any false work for the purpose of temporary shoring.

> "We propose to construct modular units away from, but relatively close to the immediate site. We would then transport by the use of portable steering dollies the units to the point of erection. Of course this will require two erection crews and cranes, one crew at the staging area and one at the final erection site.

> "These modular units will assume the configuration of two basic units. The larger and what we will refer to as the primary unit will span the full distance between piers [towers],

bearing on same and shall be three pyramids wide making the primary units 110'-0" long by 22'-0" wide. The smaller or secondary modules will be 36'-8" long by 14'-8" wide or an optional 29'-4" wide and shall be erected perpendicular to the primary units, always taking care to erect the air side modules prior to the land side so that the air side unit will act as a counterweight to the land side unit.

"All connections will be fully secured before the units are released by the crane." (Exh 1(1))

Appellant's equipment list included a 125 ton capacity Linkbelt HC-238 crane with tower attachment for use in raising the erected modules directly into place on the space frame structure and a 50 ton capacity Grove 450 hydraulic crane to assemble the modules at the staging area. The 125 ton crane was to rest at ground level and its use and frequent movement required that the area adjacent to the expanded structure and its newly constructed towers be free of major obstructions.

Appellant's erection plan was consistent with an SAA directive given at the pre-bid meeting of February 26, 1975 and incorporated in the contract documents under Addendum #2 dated March 4, 1975. This directive provided that "...the assembly of measured components must take place outside the immediate construction area to keep traffic moving and in order to fully cooperate with other contractors working at that time and in or near that particular area." The SAA Engineer, Mr. Howard Durham, approved Appellant's planned procedure and even reserved a portion of the premium parking lot for Appellant's use in assembling the space frame. The Board finds therefore that the parties contractually intended that the space frame be assembled away from the terminal in order to minimize traffic and congestion at the actual construction site.

D. Development of Dispute

On December 10, 1975, the SAA issued an invitation for bids on Contract #123-B providing for construction of the elevated roadway in front of the north and south terminals. Appellant's Mr. Scrivener testified that he immediately recognized the effect this project would have on the space frame erection procedure and requested his estimator, Mr. Elmer Maddis, to raise this matter at the pre-bid meeting scheduled for January 7, 1976. The record does not indicate whether Mr. Maddis actually voiced this concern at the meeting. However, Mr. Scrivener further testified that he telephoned the SAA's Mr. McKinney and informed him of a potential conflict. During his testimony before the Board, Mr. McKinney was not examined concerning this conversation and Mr. Scrivener's testimony thus stands unrebutted.

On January 30, 1976, bids were opened on Contract #123-B and Appellant was identified as the apparent low bidder. Appellant subsequently was awarded this contract and a notice to proceed was issued on March 15, 1976. At a pre-construction meeting for Contract #123-B held on March 29, 1976, Appellant informed Friendship Associates that the elevated roadway construction would render its space frame erection scheme unworkable. Appellant further stated that the space frame structure would have to be erected in the air with the use of scaffolding. The minutes of this meeting were furnished the SAA Construction Manager who then wrote Appellant on April 1, 1976 expressing concern over the change in erection procedure and requesting additional details.

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The change in erection procedure was not further discussed by the parties until November 15, 1976 during a meeting called by the SAA to determine the status of the space frame work. Appellant again reiterated that the unanticipated award of the elevated roadway contract precluded the use of the 125 ton crane and rendered nugatory the original plan to erect the space frame in large ground assembled modules. The parties then discussed the possible use of mobile cranes to be placed on the elevated roadway after it was constructed. As envisioned by Linder, the space frame still could have been partially assembled at ground level if a 125 ton crane could have been placed on completed portions of the elevated roadway. This scheme would have required some scaffolding to support the space frame and substantial shoring³ to protect the roadway. Due to concern over deflection and damage to the elevated roadway structure, no decision was made in this regard pending further engineering analysis.

In early December 1976, Mr. G. William Sterling, Linder's Construction Manager, met with Mr. Robert Speight of Friendship Associates to discuss the placement of a 125 ton crane on the elevated roadway. Mr. Speight expressed his concern that a 125 ton crane would exceed the loading capacity of the elevated roadway. Mr. Sterling concluded from this discussion that the placement of a 125 ton crane on the elevated roadway would therefore be prohibited. Without a crane of this size, Mr. Sterling further concluded that his alternate plan to partially assemble the space frame at ground level was no longer feasible. Calculations to justify the use of a 125 ton crane on the roadway were not submitted.

Appellant then prepared a revised plan requiring erection of the space frame in the air, pyramid⁴ by pyramid. This procedure necessitated the erection of scaffolding both for temporary support of the space frame structure and as a working platform for Appellant's crew. A 35 ton crane was to be placed on the elevated roadway to raise the Cotecno pyramids to the proper elevation and shoring was to be provided at all points beneath the crane's path in order to prevent deflection of the roadway and any resultant damage caused thereby. This procedure was detailed in working drawings submitted to the SAA on February 28, 1977 and ultimately was followed by Appellant in erecting the space frame. By letter dated March 10, 1977, Appellant informed the SAA Construction Manager that this new erection procedure would result in additional costs which would be substantiated at a later time. Appellant thereafter submitted a claim by letter dated January 26, 1978, in the amount of \$582,567. The parties have stipulated that the change in erection procedure increased Appellant's performance time by 210 calendar days and we so find.

E. Scheduling of the Pertinent Work

The space frame contract was awarded prior to solicitation of both the elevated roadway contract and those contracts involving construction of the eleven towers upon which the space frame would be supported. Although both Appellant and the SAA were aware, at the time the space frame contract was bid, that these later

³Shoring is a temporary support system which, in this instance, would have prevented deflection and cracking of the elevated roadway.

⁴The Cotecno system was shipped in the form of completed pyramids weighing approximately 700 pounds each. These pyramids were then to be connected to form the space frame.

contracts would be awarded as part of the airport expansion project, the Board finds that neither party expected them to hinder or prevent Appellant's approved space frame erection method. As previously indicated, the parties mutually intended that the space frame would be assembled away from the terminal and then transported to the construction site where it would be raised by crane into place.

In order to minimize disruption of airport operations during construction, the contract provided for the space frame to be erected in three sections. Section A (the south terminal) was to be erected first, followed by Section B (the north terminal) and then, after an estimated six to eight month period to facilitate the relocation of tenants and airport operations from the central terminal, Section C, the last of the space frame sections, would be erected. All contract work was to be completed within 990 calendar days from the actual start date or from a date ten days after the notice to proceed, whichever occurred first. No interim completion dates mandating erection of each space frame frame section by a specific date appeared in the contract.

The scheduling of Appellant's work was addressed under Paragraph 5-15(b) of the contract Specifications which provided as follows:

The Contractor shall submit within fifteen (15) days from the date of notice to proceed a progress schedule showing the phasing of all work to be performed for approval by the Engineer. The Contractor shall show, thereon, the equipment, labor and time he proposes to utilize in prosecuting the various major divisions of the work and his proposed sequence of operations. He shall also show the relationship of working days to total earnings on the progress schedule.

Appellant failed to comply with this provision because it believed that a meaningful schedule could not be prepared unless it was known when the eleven towers, upon which the space frames were to be supported, would be constructed under future contracts. Appellant's Mr. Scrivener testified that he expected to receive a systemwide schedule from the Construction Manager prior to submitting a realistic erection schedule for the space frame, although he further admitted that Contract #124 did not indicate that one would be furnished by the SAA.

On October 7, 1975, during a progress meeting, Appellant verbally presented the following erection schedule for the space frame:

Section A	start finish	9/1/76 11/1/76
Section B	start finish	12/1/76 3/1/77
Section C	start finish	7/1/77 9/1/77

This schedule was represented as being feasible only if all shop drawings were approved by the end of calendar year 1975. Although Appellant began submitting shop drawings in November 1975, technical deficiencies and other problems prevented final approval of all drawings until December 1976.

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Under a contract dated August 23, 1974, the Construction Manager was obligated to perform the following services for the SAA:

- 1. "Develop a Project time schedule utilizing critical path methodology (CPM) that coordinates and integrates the design schedule with construction schedules. Update the Project time schedule periodically at least every three months, incorporating a detailed schedule for the construction operations of the Project, including realistic activity sequences and durations, allocation of labor and materials, processing of shop drawings and samples and delivery of products requiring long leadtime procurement. Project time schedule shall include the individual tenants' occupancy requirements showing portions of the Project having occupancy priority." (Para 2.1.2)
 - "Make recommendations to Administration and Architect-Engineer regarding the division of work in the plans and specifications to facilitate the bidding and awarding of separate contracts, allowing for phased construction taking into consideration such factors as time performance, availability of labor, overlapping trade jurisdictions, provisions for temporary facilities, and so forth. Take primary responsibility for preparing bid documents reflecting this division of work." (Para 2.1.5.1)

The SAA's Mr. Howard Durham testified that the Construction Manager failed to update its original project schedule as required and did not keep the SAA apprised of systemwide construction progress. This resulted in a series of letters which were transmitted to the Construction Manager between August 1976 and May 1977 demanding CPM updates. The parties eventually agreed, in July 1977, on a less formal means of reporting contractor progress.

The SAA issued an invitation for bids on the elevated roadway contract on December 10, 1975, with bid opening scheduled for January 30, 1976. Mr. Howard Durham, the SAA Engineer, testified that this contract was advertised and awarded based upon consideration of Appellant's initial space frame erection schedule. Mr. Durham further testified that he did not foresee any conflict between the two contracts because he believed that sufficient time was provided on the elevated roadway project to enable Appellant to schedule this work around the planned erection of the space frame. However the record is devoid of any evidence showing a formal study of the interrelationship of these two contracts by either Mr. Durham or the Construction Manager, prior to the award of Contract #123-B.

F. <u>Contentions of the Parties</u>

2.

Appellant contends that the construction of the elevated roadway, Contract #123-B, prohibited the implementation of its approved erection plan and resulted in a more time consuming and costly erection procedure. Appellant further maintains that the award of the elevated roadway contract altered the character of the work under the space frame contract, entitling Appellant to an equitable adjustment in contract time and price under Paragraph 5.10 of the contract Specifications which states:

ALTERATION OF PLANS OR OF CHARACTER OF WORK

The Engineer reserves the right to make such alteration in the Plans or in the character of the work as may be considered necessary or desirable, from time to time, to complete fully and perfectly the work under the contract, provided such alterations do not change materially the original Plans and Specifications; and such alterations shall not be considered as a waiver of any condition of the contract or an invalidation of any of the provisions thereof. Should such alterations in the Plans or in the character of the work be productive of increased cost or result in decreased cost to the Contractor, a fair and equitable sum therefor, to be agreed upon in writing by the Contractor and the Engineer before such work is begun, shall be added to, or deducted from, the contract price, as the case may be. No allowance will be made for anticipated profits on work omitted.

The SAA contends that Appellant was aware that the elevated roadway project would impact its operations at the time it bid Contract #124. Further, Appellant purportedly could have avoided any interference with the space frame erection by properly coordinating the elevated roadway construction. Consequently, the SAA contends that its award of the elevated roadway contract did not materially alter the character of the work required under the space frame contract. Alternatively, the SAA argues that Appellant contractually assumed the risk that its erection plan might be affected by the work of other contractors as provided under Paragraph 5.20(a) of the Specifications which states:

> Separate Contractors on adjoining or overlapping work shall cooperate with each other as necessary. Such cooperation shall include (1) arrangement and conduct of work, (2) storage and disposal of materials, etc., by each in such manner as to not unnecessarily interfere with or hinder the progress of the work being performed by other Contractors. Contiguous work shall be joined in an acceptable manner and each Contractor agrees that in event of dispute as to cooperation the Engineer will act as referee and decisions made by the Engineer will be binding. Separate Contractors as aforesaid agree to make no claims against the Owner for any inconvenience, delay or loss experienced by them because of the presence and operations of other Contractors — it being understood that the presence of separate Contractors was obvious at the time of preparation of bids.

Finally, the SAA states that even if the award of the elevated roadway contract constituted a compensable alteration of Appellant's space frame erection plan, Appellant is not entitled to an equitable adjustment because of an alleged failure to provide adequate notice of its claim. In this regard, Appellant relies on Paragraph 5.44 of the contract Specifications as follows:

"CLAIMS TO BE MADE PROMPTLY:

"(a) Should the Contractor be of the opinion, at any time or times, that he is entitled to any additional compensation whatsoever (over and above the compensation stipulated in these contract documents or for quantities and/or amounts over and above the quantities and/or amounts allowed or approved by the Engineer) for damages, losses, costs, and/or expenses alleged to have been sustained, suffered, or incurred by him in connection with the project herein contemplated, he shall in each instance, within five (5) days after such alleged damages, losses, costs, and/or expenses shall have been sustained, suffered, or incurred, make a written claim therefor to the Engineer. On or before the fifteenth (15th) day of the calendar month succeeding that in which such alleged damages, losses, costs, and/or expenses shall have been sustained, suffered, or incurred, the Contractor shall file with the Engineer a written, itemized statement of the details and amount of such claim of damage, loss, cost, and/or expense and unless claim and statement shall be thus made and filed, in each instance, the Contractor's claim for such additional compensation shall be held and taken to be absolutely invalidated; and he shall not be entitled to any compensation on account of such alleged damage, loss, cost, and/or expense.

"(b) The provisions of this subsection shall be held and taken to constitute a condition precedent to the right of the Contractor to recover. They shall also apply to all claims by the Contractor in anywise relating to the complete project, even though the claims and/or work involved may be regarded as ,outside the contract.

"(c) It is understood and agreed, however, that nothing in this subsection contained shall be held or taken to enlarge in any way the rights of the Contractor or the obligations of the Aviation Administration under these Contract Documents."

II. Quantum

A. <u>Mitigation of Damages</u>

The Board has found that Appellant erected the entire space frame in place, pyramid by pyramid. This necessitated the use of scaffolding and increased the labor hours required to connect and weld the numerous pyramids. The SAA contends that Appellant could have mitigated the costs incurred in the actual erection procedure by partially assembling the space frame at ground level and raising completed modules⁵ with a crane positioned on the elevated roadway. These modules allegedly could have

⁵The original plan was to erect primary modules that were 110 feet long and 22 feet wide and secondary ones that were 36 feet, 8 inches long and 22 feet wide. This alternate plan involved module sizes of 22 feet or 14 feet, 8 inches in length by 22 feet in width. been assembled in basic configurations so as to facilitate their physical and geometric connection to form the two principal truss sizes of 110 feet and 36 feet, eight inches respectively. As we have already determined, a similar plan for partial erection was actually devised by Appellant in May 1976 after it learned of the elevated roadway award. This plan however necessitated the use of a 125 ton crane which Appellant later concluded could not be positioned on the elevated roadway.

During the hearing the SAA presented a very thorough analysis purporting to demonstrate that Appellant could have utilized this alternate plan with the same 35 ton crane it ultimately employed to erect the space frame. This analysis, prepared by Mr. Lawrence Stroble,⁶ assumed that the heaviest module would weigh 6300 pounds and require a crane reach⁷ of 69 feet. Mr. Stroble concluded that the 35 ton crane safely could lift 7500 pounds under these circumstances and thus was adequate to lift the basic modules pursuant to the alternate plan. Further this analysis concluded that the maximum load imparted by the crane while lifting the trusses would not damage the elevated roadway when it was supported in accordance with Appellant's shoring design.

Appellant challenged the Stroble analysis on several points. First, Mr. Stroble relied upon the wrong specifications (flysheet) for the particular crane owned by the subcontractor, Linder. The specifications used in the analysis were for a later model crane having different characteristics and a 10-15% additional lifting capacity. Of greater significance, however, was the assumption concerning the weight and configuration of the critical modules⁸ to be lifted. In actuality the most critical modules to raise were the air side trusses containing fascia pieces. These modules weigh only 5573 pounds but would require a crane reach of 78 feet from the elevated roadway. Even with the specifications for the 35 ton crane as considered by Mr. Stroble, these latter modules could not be lifted into position without upsetting the crane.

B. Damages

Appellant's revised claim⁹ for damages compares the actual costs incurred in erecting the space frame structure with the as-bid estimated cost of performing the work as planned. This claim, in the amount of \$462,269.39, is broken down as follows:

⁶Mr. Stroble is a structural engineer employed by Baltimore Contractors. He was assigned to the space frame contract as an estimator and inspector.

⁷This is the distance from the center line of rotation of the crane to the center of gravity of the module.

⁸For this analysis, the most critical modules were those which by virtue of weight and position on the space frame would have the greatest potential to upset the crane.

⁹Appellant's original claim submittal requested payment in the amount of \$500,934.91. This claim was adjusted by the SAA's certified public accountants and certain adjustments were recommended. (Exh C) Based upon this audit report and its own review, Appellant added general foreman, trucking and staging costs to its bid estimate, and subtracted pyramid repair, Change Order #4 payments, steel scrap value and labor differential costs from its actual costs. A general foreman cost was also added to the actual cost incurred.

<u>Cost Item</u>	Bid	Actual
Labor	\$170.487.60	\$ 346.580.34
Labor Fringes, Insurance & Taxes	ATTAC DOT STATE OF ALL STATE	, ,
(at 40.25% of direct labor)	68.621.26	139,498,59
Overhead & Administrative Expenses	ALL BEN DEL YEAR DISCOUL	,
(at 81.8% of direct labor)	139.458.86	283,502,72
Cranes	55,728,00	40,682,00
Welding Machines	14,670,00	23,805,00
Miscellaneous Equipment		20,000.00
(Scaffolding, Shoring, Steel beams)	4,000,00	47 461 00
Painting of Space Frame	37 471 00	71 485 00
Subtotal	\$490,436.72	\$953,014.65
Adjustments		
General Foreman	\$20,800,00	\$39,000,00
Trucking	23,500,00	400,000.00
Staging Area (rental)	7,000,00	
Pyramid Repair (Insur. Claim)		(13,216,00)
Steel Scrap Value		(2 0 1 2 0 0)
Labor Differential		(4,696,00)
Total	\$ 541,736.72	\$972,090.65
Linder's Increased Cost		
(Diff. between actual & bid)	\$430.353.93	
Profit at 10%	43.035.39	
Subtotal	\$473,389,39	
Less Change Order #4 payment	49 600 00	
Subtotal	\$423,789,32	
Calvert Overhead & Profit at 8%	33 903 15	
Subtotal	\$457,692,47	
Calvert Bond at 1%	4576.92	
Total Claim	\$462,269,39	

Both an audit report and a counterstatement of costs were prepared by the SAA presenting a number of challenges to Appellant's claim. In order to focus on the points raised by the SAA, it is essential to review each of the various cost items.

1. Labor Costs

Appellant¹⁰ alleges that it incurred direct labor costs of \$341,124.34 in erecting the space frame.¹¹ The SAA auditors did not adjust this figure. However Mr. John Jenkins, the SAA Construction

 10 Since the assembly and erection work was performed by the subcontractor, Linder, we are actually referring to Linder's costs.

¹¹Appellant originally contended that its direct labor costs were \$346,580.34. However during the course of the hearing, an adjustment of \$5,456 was made to remove the labor cost incurred while repairing pyramids damaged in transit.

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Manager, prepared an estimate of what he considered it should have cost Appellant to erect the space frame, absent contractor inefficiencies and other non-claim related factors. Mr. Jenkins concluded that only \$333,461.55 should have been spent on direct labor. On cross-examination, Mr. Jenkins admitted that Change Order #4,¹² included \$13,000 in labor costs which Appellant elsewhere has deducted from its claim, thereby reducing the total actual labor costs claimed below his estimate. Thus there is no challenge to Appellant's total actual labor costs and they are considered reasonable.

The parties are in disagreement concerning the estimated cost of erecting the space frame pursuant to the original procedure. Appellant uses its bid estimate, based on the Mero system, to establish the as-planned labor costs. This bid estimate was adjusted to add welding labor, resulting in total as-planned direct labor costs of \$170,581.13. The SAA's Mr. Jenkins has estimated the cost of assembling and erecting the Cotecno components, as-planned, and submits that Appellant would have expended \$275,569.24 in labor costs.

The as-planned labor costs are segregable into five separate categories for analysis. These are (a) unload and sort, (b) assemble, erect, plumb, guy and bolt, (c) shoring, (d) scaffolding, and (e) welding.

a. Unload and Sort

Appellant alleges that it was less efficient to unload and sort the space frame components at the construction site than it would have been at a remote assembly site as originally contemplated. This inefficiency is said to be reflected in the following man-hour difference:

Laborer/ Equipment	Est. Man-hours (Mero)	Act. Man-hours (Cotecno)	MH Diff.
Foreman	40	343	303
Journeyman	160	814	654
Apprentice	0	260	260
Crane Operator	40	356.5	316.5
Crane Oiler	40	305	265

¹²Change Order #4 was signed by the parties on December 7, 1978 and increased the contract amount by \$54,103. Of this amount, Linder received \$49,600 for the additional costs it incurred in accelerating the start and completion of Section C of the space frame. Overhead and profit was included in this amount.

Instead of Appellant being able to unload and sort the components in 5 crew days,¹³ it thus took approximately 37 crew days as actually performed.

The SAA contends that the major portion of this increase resulted from the use of Cotecno components which were shipped as completed pyramids weighing 700 pounds each. Mero, on the other hand, would have shipped its components in relatively compact bundles or crates. Even had the as-planned erection procedure been followed, Appellant would have had to unload an additional 95 truckloads of material based on the increased bulk of the Cotecno shipments.

Unfortunately, the record does not set forth either the actual or estimated number of material truck-loads involved. However, by letter dated January 26, 1978, Appellant estimated that its as-planned procedure would have involved 120 truckloads of Cotecno pyramids, unloaded at the rate of seven truckloads per crew day, for a total of 17 crew days. The SAA has accepted these figures as reasonable and the Board will do likewise. Accordingly, the Board finds the reasonable as-planned labor requirements to be:

Foreman	136 mh (8 hr x 17 days)	
Journeyman (4)	544 mh	
Crane Operator	136 mh	
Oiler	136 mh	

b. Assemble, Erect, Plumb, Guy & Bolt

Appellant's as-planned versus actual man-hours for this work appear as follows:

	Est. (MH)	Actual (MH)	Diff.
Foreman	1,624	3,343.0	1,719.0
Journeyman	5,856	10,695.5	4,839.5
Apprentice	0	2,086.0	2,086.0
Crane Operator	1,584	1,831.5	247.5
Crane Oiler	1,584	1,446.0	138.0
Surveyor	160	948.5	788.5

¹³Assuming a typical crew, as-planned, consisted of a foreman, four journeymen ironworkers, a crane operator and an oiler, a crew day is estimated at 56 man-hours. Dividing 56 man-hours into the total number of actual hours worked results in the number of crew days worked. This difference is alleged to have resulted solely from the inefficiency inherent in assembling and erecting the pyramids in the air. The SAA admits that certain inefficiencies would result from so erecting the space frame but contends that Appellant's estimate is unreasonable. This contention again stems from Appellant's use of the Mero system to calculate its as-bid costs.

Appellant assumed that since the Mero system had over 20,000 pieces, it necessarily would require more labor hours to assemble than the Cotecno system which is partially assembled by the manufacturer. The SAA contends that the Mero system nevertheless would have been less expensive to assemble because each piece weighed approximately 70-100 pounds and much of the work could have been accomplished by hand. Further, the SAA alleged that even if the space frame was assembled as planned, the top chord connections still would have occurred at heights ranging from 11 to 18 feet above ground.

The SAA's estimate of the as-planned procedure

Foreman Journeyman	1,849 10,467	mh ¹⁴ mh
Crane Operator	1,849	mh
Oiler	1,459	mh
Engineer/Surveyor	666	mh

is as follows:

Assuming an 8 hour workday, the SAA estimate would involve approximately 231 crew days (1849 : 8) for the assembly and erection of the space frame. Appellant's estimate would require 203 crew days (1624 : 8). In reviewing these estimates the Board takes note of the October 7, 1975 work schedule which called for erection of the space frame in eight months or 176 workdays.¹⁵ This is the same erection schedule which the SAA alleges was feasible at the time the elevated roadway contract was awarded. In view of this fact, the Board cannot find the SAA estimate of 231 crew days credible. Further when the use of multiple crews and/or overtime is taken into account, the 203 crew days estimated by Appellant in its bid compares favorably with the 176 working days set forth in the original schedule. Accordingly, the Board finds Appellant's

 15 This assumes 22 workdays per month.

 $^{^{14}}$ This figure is obtained by adding the SAA estimates for setting up a scaffold at the erection site, assembling the main sections, assembling the secondary sections, trucking the sections to the site, erecting the main sections, erecting the secondary sections, erecting the curtain wall, aligning the fascia and attaching the roof purlins. (Exh V Sect 5)

estimate of 203 crew days to be reasonable and computes the as-planned man-hours as follows:

Foreman (1) Journeyman (4) Crane Operator (1) Oiler (1)	8 hr/day x 203 days = 1,624 mh 32 hr/day x 203 days = 6,496 mh 8 hr/day x 203 days = 1,624 mh
Oner (1)	$8 hr/day \times 203 days = 1.624 mh$

Although the SAA has added additional journeymen ironworkers to its crew sizes for the assembly of the space frame sections, the Board finds no justification for this in the record. If anything, the Cotecno system would be less labor intensive, depending upon a crane to move the pyramids into position for connection. The Metro system, on the other hand, would have required ironworkers to physically attach many of the thousands of components, thus mandating greater manpower.

With regard to the estimate for

surveyor/engineer man-hours, there is nothing in the record which permits us to calculate the precise requirements. The difference between Appellant's estimated and actual man-hour figure however appears to be unreasonably large and its estimate provides no basis for the increase. The SAA estimate, on the other hand, is quite detailed and the Board accepts its calculation of 666 man-hours for surveying, as reasonable.

c. Shoring

In order to prevent deflection of the elevated roadway due to the weight of the 35 ton crane and its lifting load, shoring was required to reinforce the roadway. Since Appellant had intended to erect the space frame prior to the construction of the elevated roadway, no money was included in the bid price for shoring installation. Thus the entire cost of the labor necessary to install the shoring is sought by Appellant.

The actual labor hours incurred by Appellant in shoring the roadway appear as follows:

Foreman	66.5 mh
Journeyman	168.5 mh
Apprentice	58.0 mh
Crane Operator	13.0 mh
Oiler	13.0 mh

Since the Board already has determined that Appellant's total actual labor costs were reasonable and consistent with the SAA estimate, there is no need to reconcile these totals with the SAA estimate for shoring.

d. Scaffolding

As with shoring, no money was included in the bid estimate for scaffolding and Appellant thus seeks its actual costs incurred for this work. These costs are reflected in the following labor man-hour totals:

Foreman	582.5	mh
Journeyman	1542.5	mh
Apprentice	498	mh
Crane Operator	293	mh
Oiler	86	mh
Surveyor	11.5	mh

e. Welding

The Cotecno pyramids were designed to bolt together at the base nodes. In reviewing Appellant's shop drawings, the SAA determined that the planned two bolt connection was insufficient to withstand the forces exerted by connecting members. Further a larger node, permitting four bolts, was esthetically inappropriate. Consequently, Appellant was required by the SAA architects to weld the nodes in order to supplement the two bolt connection.

The requirement to perform this welding is not now in dispute. However, Appellant does seek the differential cost between welding at ground level and welding in place. Since welding was not anticipated at bid, this work had not been included in the original bid estimate and Appellant had to prepare such an estimate for these proceedings. By comparing the actual man-hours incurred with this estimate for asplanned welding, Appellant computed the increased labor hours resulting from the change in erection procedure. This appears as follows:

Estimated MH	Actual MH	Diff.
978	1400.5	422.5
4,890	7882.0	2,992.0
0	240.5	240.5
0	150.0	150.0
0	141.0	141.0
	Estimated <u>MH</u> 978 4,890 0 0 0	Estimated MH Actual MH 978 1400.5 4,890 7882.0 0 240.5 0 150.0 0 141.0

The SAA estimate for the as-planned welding is

as follows:

Foreman	1,190.34 mh
Journeyman	5,951.72 mh

The SAA's Mr. Jenkins testified that his estimate for asplanned welding was somewhat higher than Appellant's due to the bottom chord splicing arrangements. Mr. Jenkins explained that Appellant's as-planned procedure originally involved secondary modules¹⁶ geometrically comprised of either three pyramid by five pyramid or two pyramid by five pyramid trusses. However, Appellant used, as the basis for its estimate, modules consisting of three by four pyramid sections, thus reducing the number of splices and the as-planned cost. For this reason the Board accepts the SAA estimate as reasonable.

Before totalling the as-planned labor man-hours, adjustments must be made for expected weather delays. Both Appellant and the SAA each added 160 man-hours to their estimates for foreman and crane operator hours. This assumed that 10 working days would be lost to weather.

Accordingly, the Board finds the total as-planned labor manhours to be:

Foreman	3110.34
Journeyman	12991.72
Crane Operator	1920.00
Oiler	1760.00
Surveyor	666.00
Apprentice	0.00

Finally, in order to compute the as-planned labor costs, the Board must determine the applicable hourly wage rate for each trade. Appellant's claim took an average of the total hourly wages, including overtime, paid on the job per trade. The SAA contested this approach because of Appellant's inclusion of labor costs incurred beyond the extended contract completion date. Further, the SAA argued that the more reasonable method of measuring wage increase was to compare the actual wage rates applicable when Appellant would have erected each section of the space frame with those actually incurred.

At the hearing Appellant adjusted its average wage rates by removing all labor costs incurred after the adjusted contract completion date. Using Appellant's adjusted average wage rates per trade, the asplanned labor costs would amount to \$202,424,67. The SAA rates would produce a labor cost increase of \$201,749.89¹⁷ Both of these computations are somewhat distorted in that the SAA wage rates do not consider overtime wages and Appellant's averaging technique would tend to increase slightly the applicable labor rate. Accordingly, the Board finds that Appellant's asplanned labor costs should have been \$202,000. The total increase in direct

 16 The secondary modules consisted of 36 foot, 8 inch trusses. Each pyramid was 7'-4" in length and width at its base.

 17 In computing this figure the Board assumed that 18% (2 of 11 sections) of the labor hours per trade would be expended on Section C.

labor costs as a result of the change in erection procedure was therefore \$139,124.34 (\$341,124.34 minus \$202,000).

2. Labor Fringes, Taxes & Insurance

Appellant's claim submittal requests payment for labor fringes, taxes and insurance at the rate of 40.25% of its increased direct labor cost. This figure is derived by averaging these costs as a percentage of direct labor for fiscal years 1976, 1977 and 1978.¹⁰

The SAA auditor confirms Appellant's rate but recommends that a two year average of 38.39% be used. The basis for this recommendation is that Appellant performed its erection work in fiscal years 1977-79. No erection work was performed in fiscal year 1976.

Appellant argues that the use of 1976 labor figures helps provide an historical average which more accurately reflects the true labor markup. The Board cannot agree. In the absence of evidence establishing that the labor fringe rates for fiscal years 1977-78 are disproportionate, the Board accepts them as a reasonable basis for determining Appellant's labor markups for work performed during those two years.

3. Overhead and Administrative Expenses

Appellant's claim includes overhead and administrative expenses calculated at 81.8% of its direct labor costs. This percentage is a weighted average of those rates computed for fiscal year 1976 through January 31, 1978. Overhead items included in these calculations include indirect labor, depreciation, erection supplies, equipment rentals, equipment maintenance and taxes, fuel, and truck insurance. The administrative expenses included advertising and promotional costs, automobile expenses, communications, dues and subscriptions, interest, insurance, office expenses, pensions, payroll taxes, professional fees, rent, salaries, personal property tax and travel.

The SAA auditor used a two year weighted average to compute the applicable rate. Further adjustments were made to the overhead and administrative pools to remove indirect costs which are allowable under the Federal Procurement Regulations (e.g., interest, contributions) and those equipment related costs which have been charged directly under Appellant's claim. Accordingly, the auditor's recommended overhead and administrative expense rate is 55.88% of the direct labor costs.

4. Cranes

Appellant originally planned to use a 50 ton crane at the assembly area and a 125 ton crane at the erection site. The original bid estimate included \$55,728 for these cranes. In actuality, Appellant

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¹⁸Appellant's (Linder's) fiscal year ends on October 31.

employed 15, 35 and 82 ton¹⁹ cranes to erect the space from at a cost of \$40,682.30. This resulted in a credit to the SAA of \$15,045.70.

The SAA auditor confirmed the actual costs incurred based upon internal equipment rates generated in accordance with Appellant's standard accounting practices. The SAA nevertheless challenged the amount of the credit based upon the estimates prepared by its Mr. Jenkins. The Jenkins' estimates concluded that crane costs of \$71,327, under the asplanned procedure, and \$39,445.60, under the actual procedure, should have been incurred. The net credit therefore is alleged to be \$31,881.40.

The primary difference between the parties lies in the respective estimates for the as-planned procedure. As we have already found, a reasonable as-planned estimate would have provided 1920 man-hours for a crane operator. Reducing this amount by the 10 day bad weather factor, the Board finds that the as-planned procedure would have required 1760 hours of actual crane usage. Assuming that $45\%^{20}$ of these hours would involve the 125 ton crane, the as-planned equipment cost would be as follows:

125 ton crane = 792 hours	at \$48.00/hr = \$ 38.016.00
50 ton crane = 968 hours	at \$30.00/hr = 29,040.00
Total 1760 hours	\$ 67.056.00

As for the actual cost ascribed to the cranes, the parties essentially are in agreement. The slight difference appears to be attributable to the 82 ton crane employed by Appellant under Change Order #4. Since the amounts received for Change Order #4 have been deducted by Appellant elsewhere, the Board accepts Appellant's recorded crane costs as reasonable. The net credit for crane usage should thus be \$26,373.70.

5. Welding Machines

Appellant contends that its welding costs were increased as a result of performing the work in place. The Board previously has found that the journeyman ironworker labor for welding under the original plan should have totalled 5951.72 man-hours. This also should equal the number of hours that a welding machine would have been necessary.

Appellant actually utilized the welding machine for 7935 hours. During performance, however, the welding machine was employed for 367 hours to effect repairs to certain pyramids which were damaged in transit. Since this work was unrelated to the change in erection procedure,

¹⁹The 82 ton crane was used to erect the C section under Charge order #4. Appellant has already been compensated for its use and did deduct the amount received in its claim.

 20 Appellant envisioned that 45% (656 of 1464) of the crane hours would involve the 125 ton crane.

the Board deducts the 367 hours from the total welding machine hours, leaving 7568 hours of welding related to the actual erection procedure.

The SAA contends that the actual welding machine use should total 6784 hours. This position is based upon an estimate prepared by Mr. Jenkins who has reduced the actual welding machine use by the welding hours included under Change Order #4. Again, since Appellant has deducted Change Order #4 receipts from its claim, the Board sees no need further to adjust the actual hours of welding machine usage and finds that the 7568 hours is reasonable.

Appellant's accounting procedures mandate an internal charge of \$3.00 per hour for company owned welding machines. This was confirmed by the SAA auditor. Accordingly, the Board finds that the change in erection procedure resulted in greater welding machine usage, thereby increasing Appellant's costs as follows:

(7568 hours minus 5951.72 hours) at \$3.00 per hour = \$4,848.84

Miscellaneous Equipment & Allowances

Appellant's bid estimate included \$4,000 for miscellaneous safety and erection equipment. Under the actual erection method however, Appellant claims it incurred \$47,461.18 in costs for scaffold rental, support beams²¹ and saddles²² which would not have been necessary but for the change in procedures. The difference between actual costs and bid estimate, \$43,461.18, constituted Appellant's original claim. After reviewing the SAA's counterstatement of costs however, Appellant revised its estimate of as-planned miscellaneous equipment and allowance expenses to include the cost of the staging area, trucking, and a general foreman. Actual costs incurred also were adjusted first downward by \$2,012 to reflect the salvage value of certain steel beams used in the erection procedure and then upward to include general foreman wages. Appellant's revised claim total for this item is thus:

Item	Actual	As-Planned	
Erection Equipme Safety Equipment	ent t		\$2,000 2,000
Staging Area		\$0	7,000
Trucking Costs		0	23,500 23

 $^{^{21}}$ The support beams were placed across the top of the scaffolding to support the bottom chord of the space frame. (Tr 272)

²²Saddles are pieces of wood which have been cupped to fit around the tubular steel comprising the bottom chord of the space frame.

 $^{^{23}}$ Appellant adjusted its estimate to reflect an as-planned cost of \$20,800. This was the amount estimated by the Construction Manager. (Exh V, p. 45) However, Appellant's original bid estimate shows \$22,000. (Exh B(2), p. 9)

General Foreman	39,000	22,000
Scaffold Rental	23,452.76	,••••
Beams, etc.	20,121.82	
Saddles	3,886.60	
Salvage Value Steel	2,012	
Totals	\$84,449.18	\$56,500
		-\$97 0/0 10

The SAA estimate would include actual miscellaneous expenses of \$91,466 (including general foreman) and as-planned expenses of \$62,529 for a difference of \$28,937. Although the parties obviously used different approaches to this item, the net dollar change is nearly identical.²⁴ For this reason the Board finds that Appellant's computation of added miscellaneous costs, in the amount of \$27,948.18, is reasonable. This amount does not include the cost of office and storage trailers used during the extended contract performance period. While it is acknowledged that the SAA estimate included a net increase of \$1,610 for this item, the Board finds that the SAA estimate for salvage value was unreasonably high, thereby offsetting the office and storage trailer adjustment.

7. Painting of Pyramids

When the Cotecno nodes were welded for reinforcement, the paint on the factory finished tubular sections was marred. This resulted in a requirement to repaint the welded sections of the pyramids. Since welding originally was not anticipated, no money for touch up painting was included in the bid price.

As with the welding costs, Appellant does not here dispute the requirement to perform touch-up painting. Appellant instead seeks the cost differential between painting the welded areas in place as opposed to the ground.

Appellant has prepared an estimate of the number of welding points involved on the project. Using its as-planned erection procedure, Appellant estimated those points which would have been welded in the air²⁵ and on the ground. This estimate gives the equivalent number of areas to be repainted both on the ground and in place. By applying a cost factor for painting to each point, an as-planned estimate was obtained as follows:

points on ground	2055 at \$7.00 ea=	\$14,385
points in air	1649 at \$14.00 ea=	23,086
		\$37,471,00

 24 If the Board corrects the SAA as-bid estimate for general foreman wages as it did Appellant's, the difference is only \$200.

²⁵Even under the original procedure, welding in the air was required where the secondary modules connected to the primary modules.

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The actual touch-up painting was performed by G. G. Schmick Painting Company²⁶ at a cost to Appellant of \$71,485. The difference between the actual and estimated cost, \$34,014, is said to be the increased cost of painting in place.

The SAA alleges that the maximum amount Appellant is entitled to is the original number of points on the ground multiplied by the cost differential between ground and in place painting (2055 points at \$7.00 ea = \$14,385). The SAA's Mr. Jenkins also prepared an estimate of what he believed the actual and as-planned painting costs should have been. These appear as follows:

Actual	\$19,306
As-Planned	16,474
Difference	\$ 2,832

With regard to the actual cost of performing all painting in place, the SAA has failed to show that the actual costs incurred were unreasonable or resulted from contractor inefficiencies. The Board therefore finds that the reasonable cost of performing all painting in place is the actual cost incurred in the amount of \$71,485.00. See C. J. Langenfelder & Sons, Inc., MDOT 1000, 1003 & 1006 (August 15, 1980), p. 19.

In our discussion of welding labor costs, the Board previously determined that the SAA's estimate of as-planned labor hours was reasonable. Accordingly, the Board finds that the number of weld points contained in the SAA's as-planned estimate of welding (3641 points) also establishes the reasonable number of points to be painted on the job. Dividing this figure into the total cost incurred for painting in place provides the actual cost for painting each point in the air, that is: \$71,485: 3641weld points (Exh V, p. 46) = \$19.63 per point. Using Appellant's estimated cost of \$7.00 per point for ground painting, the cost differential between in place and ground painting is thus \$12.63 per point.

The SAA welding estimate further concluded that 1771 points were required to be welded at ground level²⁷ under the as-planned procedure. Accordingly, the Board finds that the total increase in painting costs due to the requirement to perform all work in the air was: 1771 points x \$12.63 = \$22,367.73.

 $^{^{26}}$ G. G. Schmick had a fixed price contract to paint the nodes on the pyramids which arrived with a yellow coating. The invoice for \$71,485 was for the extra costs involved in the touch up work.

 $^{^{27}}$ The SAA alleged that of these 1771 points, 726 were top chord points located approximately 11 to 18 feet off the ground. The top chord would have been more expensive to paint even under the as-planned procedure. While the Board recognizes this factor, the \$7.60 per point ground cost utilized by the Board is sufficiently higher than the SAA estimate so as to balance any inequity.

8.

Calvert Bond Costs

Calvert General Contractors has claimed additional bond costs at 1% of its increased costs. The SAA auditor reviewed Calvert's actual bond rate for added contract work and determined it to be 0.7%. The Board finds that this actual rate is reasonable and should be applied in computing damages.

DECISION

When the Cotecno pyramids first were delivered to the site in April 1977, it was no longer possible to erect the space frame structure as originally planned. At that time, construction of the elevated roadway had been under way for over a year and the roadway deck in front of the south terminal had been formed. This work as well as the on-going roadway construction in front of the north terminal precluded the use of a 125 ton crane at ground level to raise completed space frame modules into place. For this reason, Appellant alleges that the award of the elevated roadway project constituted an alteration of either the contract plans or the character of the space frame work entitling it to an equitable adjustment pursuant to Paragraph 5.10 of the contract Specifications. Under this provision, however, any increase or decrease in cost is to be agreed upon in writing before the work is performed. Although Appellant argues that the Engineer may constructively alter the work pursuant to Paragraph 5.10, thereby obviating the need to agree on price beforehand, there is no need to so find. In this construction contract, as in every contract, there is an implied obligation that neither party will do anything to hinder the performance of the other party. Dewcy Jordan, Inc. v. The Maryland-National Capital Park and Planning Commission, 258 Md. 490, 265 A.2d 892 (1970); Continental Masonry Co., Inc. v. Verdel Construction Co., Inc., 279 Md. 476, 369 A.2d 566 (1977). If the SAA breached this obligation, Appellant will be entitled to recover its increased costs in the form of damages.

In order for Appellant to prevail however, it must show that the award of the elevated roadway contract necessarily hindered or prevented its planned space frame erection procedure. If it appears to this Board that the erection of the space frame was impacted by Appellant's own conduct, or that Appellant otherwise assumed the risk of such disruption under the terms of its space frame contract, recovery may not be permitted. Restatement of Contracts, § 315; Williston On Contracts, § 1296.

During the hearing, the SAA introduced a "Time Relation Study" prepared by its Construction Manager, Mr. John Jenkins. This study was intended to show how Appellant might have erected the elevated roadway in front of the north and south terminals without impact on the original space frame erection plan. Mr. Jenkins testified that his study assumed that Appellant would erect the space frame pursuant to its original schedule. On cross-examination, Mr. Jenkins further testified that if the space frame sections were not erected within the time periods forecast in the original schedule, his study would show an unavoidable interference between the elevated roadway construction and Appellant's planned space frame erection method, denying Appellant the use of a 125 ton crane at ground level. The Jenkins' study thus crystallizes the initial issue for determination, namely whether the SAA reasonably relied on the October 7, 1975 space frame schedule in determining when to award the elevated roadway work.

The SAA first contends that it was reasonable to expect Appellant to erect the space frame sections as originally scheduled because Appellant was contractually

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obligated to achieve the interim completion dates contained therein. However, as the Board has found, Appellant was obligated only to perform its space frame work, in sections, within a 990 day calendar period. No contractual requirement to complete each section by a specific date existed.

The SAA next maintains that it reasonably believed the original space frame schedule to be viable when awarding the elevated roadway contract, based upon Appellant's failure to raise the potential conflict prior to submitting its bid thereon. However, the only evidence of record in this regard is the unrebutted testimony of Mr. Scrivener who stated that he informed the SAA Construction Manager of a potential conflict prior to bidding the elevated roadway contract.

When the SAA received Appellant's original space frame schedule on October 7, 1975, it concomitantly was informed that the interim completion dates set forth therein were feasible only if all shop drawings were approved by the end of 1975. The SAA further knew when it awarded the elevated roadway contract in March 1976 that no shop drawings had been approved for the space frame and that substantial problems in this regard were being encountered by Appellant. The Board finds, under these circumstances, that the SAA was under a duty to assess Appellant's progress under the space frame contract prior to awarding the elevated roadway contract so as to assure that the space frame could be constructed without interference. <u>Chalender v.United States</u>, 119 F. Supp. 186 (Ct. Cl. 1954). The SAA omitted to perform this duty, thereby giving rise to the conflict which prevented Appellant from erecting the space frame as it had planned.

Alternatively, the Board will now consider whether Appellant assumed the risk of interference by another contractor. The SAA insists that Appellant did assume such a risk pursuant to Paragraph 5.20(a) of the contract Specifications which states that:

"...Separate Contractors as aforesaid agree to make no claims against the Owner for any inconvenience, delay or loss experienced by them because of the presence and operations of other Contractors – it being understood that the presence of separate Contractors was obvious at the time of preparation of bids."

Paragraph 5.20(b) however provides that:

"Notwithstanding the aforesaid, the Owner must reserve the right, in case of emergency, to award subsequent Contract(s) (contiguous to or overlapping prior Contracts). In this instance the last Contractor in said continuous and/or overlapping area will be required to conduct his operation without undue interference or obstruction to prior Contractor(s). The Engineer will, in case of dispute as to cooperation, bear in mind the fact that the Contractor of latest award had knowledge or [sic] (of) prior Contract(s) and prior Contractor(s) did not know of the subsequent Contract(s)." (Underscoring added.)

The Board interprets these provisions reasonably to preclude claims against the SAA due to interference beyond the control of the SAA and caused by a contractor who was on the site prior to award of Appellant's contract. Compare Hoffman v. United States, 340 F.2d

645 (Ct. Cl. 1964); <u>Shea-S & M Ball v. Massman-Kiewit-Early</u>, 606 F.2d 1245 (D.C. Cir. 1979). The potential of such claims thus would have been foreseeable to Appellant at the time of bid. Considering that Appellant' contract preceded the elevated roadway award and that the planned erection procedure was consistent with the SAA's intent to have the space frame assembled away from the terminal, it was reasonable for Appellant to anticipate that the SAA would preserve its priority to the work area and permit it to erect the space frame as bid and planned without interference. Accordingly, the Board finds that Appellant assumed no risk that its planned erection procedure would be rendered inutile by work under a subsequently issued contract.

Finally the SAA contends that even if it hindered or prevented Appellant from erecting the space frame as planned, Appellant is not entitled to recover because it failed to give proper notice as mandated by contract Specification 5.44. The Board does not agree.

Appellant first notified the SAA on March 29, 1976 that the space frame erection procedure would have to be changed due to unexpected conflicts with the construction of the elevated roadway. Although Appellant did not then state that this action would result in additional costs, it is evident that the SAA became concerned because of a potential claim in this regard. During the following year, the SAA Construction Manager transmitted numerous letters alleging that Appellant had been fully cognizant of the elevated roadway at the time it bid the space frame and thus should have anticipated interference.

On February 28, 1977, Appellant tendered a revised erection scheme to the SAA Construction Manager. By letter dated March 10, 1977, Appellant then notified the SAA that this new procedure would result in additional costs. Since the erection of the space frame did not commence until April 1977, the SAA was aware of Appellant's claim prior to costs being incurred under the revised erection procedure.

The space frame erection ultimately was completed in the latter part of 1978. A written itemized statement of damages was submitted to the SAA on January 26, 1978, well before the completion of work.

Our findings clearly demonstrate that the SAA was placed on notice of a claim prior to the incurrence of costs and was provided an itemized breakdown of the claim prior to completion of the work. Since Paragraph 5.44 of the contract Specifications is intended to protect the public against stale claims and permit the Engineer to make a timely investigation of damages, the Board finds that reasonable and adequate notice was provided the SAA to achieve these purposes. <u>Compare Eastover Stores, Inc. v. Minnix</u>, 219 Md. 658, 150 A.2d 884 (1959); <u>Rea Construction Company v.</u> State Roads Commission, 174 A.2d 577 (Md. 1961).

In summary, the Board finds that Appellant, upon entering into the space frame contract, had a right to anticipate that subsequent contracts would not be awarded in a manner so as to hinder or prevent its erection procedure. By awarding the elevated roadway project without consideration of Appellant's progress under its space frame contract, the SAA effectively precluded the planned use of a 125 ton crane at ground level to lift completed modules into place. This constituted a breach of the implied obligation not to hinder or prevent the Appellant's performance and the Board so finds.

We next consider damages. In this regard, Appellant has the burden of establishing the increased costs it incurred as a result of a change in erection procedure. Although Appellant's damages need not be proven with mathematical

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certainty, a reasonable basis for determining the amount due must be established. <u>Dialist v. Pulford</u>, 42 Md. App. 173 (1979), 399 A.2d 1374; <u>C. J. Langenfelder & Sons</u>, <u>Inc., supra</u>. In our Findings of Fact we have reviewed Appellant's as-bid estimate and actual costs for the assembly and erection of the space frame. While we did not agree fully with Appellant's estimates and allocation of incurred costs, a sufficient basis did exist for computing the reasonable as-planned and actual costs of performance. The Board further finds that the increased costs determined in our Findings of Fact were generated solely by the change in the procedure for assembling and erecting the Cotecno pyramids.

Before totalling the increased costs attributable to the SAA breach, the Board initially must decide the applicable administrative and overhead rate. As noted in the Findings of Fact, Appellant contends that the applicable rate is 81.8% of its increased labor costs, while the SAA auditor would reduce this rate to 55.88%. The Board, however, is unable to find either of these rates applicable.

In considering overhead and administrative costs, it is essential to divide the contract into two performance periods. The first period is the original 990 days provided for performance under the contract and the second period is the 210 day time extension directly caused by the change in erection procedures.

When preparing its bid, Appellant is presumed to have included all indirect costs which it intended to be absorbed by this particular contract over the original 990 day performance period. These indirect costs would then have been recovered upon receipt of progress payments totalling the full as-bid contract price. Since payments under the instant contract have exceeded the original contract amount, Appellant has indeed been able to recover its allocated indirect costs for the original 990 day period. In order to recover additional indirect costs for this same period, Appellant must show that its indirect costs, allocable to this contract, were increased due to the change in erection procedure. The Board is of the opinion however that Appellant has not met this test.

Indirect costs are incurred at both the contractor's home office and at the job site. These costs are of both a fixed and variable type. Appellant has combined all of these costs in a single overhead pool and compared them to direct labor costs for a comparable period to obtain a percentage. This percentage was then applied to the increased labor costs resulting from the change in erection procedure to derive the additional indirect costs purportedly attributable to the breach.

Our first difficulty with this approach is that not all of the overhead costs would increase as a direct result of additional labor costs at a contract job site. Home office administrative costs, for example, are on-going expenses and remain the same regardless of increased field costs. Fixed job site costs for items such as trailers and communications also would not be affected by increased labor costs during the original contract period. Without a showing, therefore, that fixed costs either increased or were underabsorbed by the contract work during the original 990 day performance period, Appellant is not entitled to any costs of this type. See B. J. Lucarelli Co., Tnc.. ASBCA No. 8768, 65-1 BCA ¶ 4655; Kemmons-Wilson, Inc. (Florida) and South & Patton, Inc., A Joint Venture, ASBCA No. 16167, 72-2 BCA ¶ 9689.

With regard to variable overhead, Appellant's books of account reflect indirect costs for erection supplies, equipment rentals, equipment maintenance and taxes, fuel, equipment installation, and indirect labor. Expenses of this type clearly are affected by increased direct labor and equipment requirements on a particular contract during the original performance period. However, in computing damages, Appellant has included these additional indirect costs as direct charges. Consequently, the Board is unable to find any further entitlement to increased variable overhead for the original 990 day contract period.

We now consider the 210 day extended period of performance. Overhead costs for this period of performance were not included in the original bid price, nor were they necessarily absorbed by Appellant's other contractual work. Consequently, fixed job site and variable overhead expenses, to the extent they were incurred during the extended period and not elsewhere compensated for as direct charges, may be recovered by Appellant. <u>Carney General Contractors, Inc.</u>, NASA BCA 375-4, 79-1 BCA ¶ 13855. Further allocable and allowable home office overhead, incurred during this extended period of performance, also may be recovered.

The record before the Board unfortunately does not provide a basis for computing extended overhead costs. The Board is convinced however that there is entitlement to some such costs. Given the fact that neither party attempted to compute overhead costs in the manner adopted by the Board, fairness dictates that we remand this issue to the SAA Administrator for negotiation. In so doing the Board finds that the allowability of overhead costs is to be governed by generally accepted accounting principles and not by the Federal Procurement Regulations which are inapplicable to the instant contract.

With the exception of any additional extended overhead costs which the parties are to negotiate, the Board finds that Appellant is entitled to the following damages:

Description	Actual Cost	As-Planned Cost	Diffcrence
Direct Labor Labor Fringes, Taxes	\$341,124.34	\$202,000.00	\$139,124.34
& Insurance at 38.39%	130,957.63	77,547.80	53,409.83
Overhead & Admin. expenses			- 0
Cranes	40.682.30	67.056.00	(26,373,70)
Welding Machines Miscellaneous Equipment	22,704.00	17,855.16	4,848.84
& Allowances	84,449.18	56,500.00	27,949.18
Painting of Pyramids Linder Increased Costs Linder Profit at 10% Subtotal	71,485.00	49,117.27	$\begin{array}{r} \underbrace{22,367.73} \\ \$221,326.22 \\ \underline{2,132.62} \\ \$243,458.84 \end{array}$
Less Change Order #4 Payments			40 600 00
(Incl. Overnead + Profit)			\$103.858.84
Calvert Commission at 8%			15,508,71
Subtotal			\$209,367,55
Calvert Bond at 0.7%			1,465.57
Total			\$210,833.12

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In addition to this sum, Appellant requests that interest be awarded as an element of damages. Although no evidence was adduced with regard to specific borrowings for the work performed under this claim, this Board previously has found that the award of interest is within its discretion and not prohibited by Maryland law. C.J. Langenfelder & Sons, Inc., supra. Appellant has expended nearly \$200,000 in excess of what it anticipated but for the SAA's breach. Given the inordinately high interest rates prevalent in today's economy, Appellant would not be compensated by payment of his increased costs alone. Award of interest is thus essential to make Appellant whole. On the other hand, the Board believes that the SAA should not be responsible for interest costs until such time as it could have determined with reasonable certainty the increased cost of performance and had an opportunity to process payment. The Board finds that the SAA had sufficient knowledge to determine its liability on the date the space frame was finally completed. The SAA, by monitoring Appellant's performance, could have ascertained the labor and equipment requirements involved in the actual work, attached a value, and then by comparing these costs with an estimate of the as-planned work, determined its liability.

Although the record does not disclose when the space frame erection was completed, the SAA shall be responsible for interest from a date ninety (90) days after completion of this work. The ninety (90) day period is adequate to have permitted the SAA to conduct any necessary audit, finalize its computations and process payment. Interest as an element of damages thus shall be chargeable as follows:

- 1. From a date ninety (90) days after space frame erection was completed until June 30, 1980 at 6% per year.
- 2. From July 1, 1980 to date of this decision at 10% per year.

These percentages shall be applied as described to Appellant's increased costs of \$210,833.12 plus any allocable and allowable extended overhead costs to obtain the total damages attributable to the breach of contract. Interest also shall be payable at 10% per year, on the total amount of these damages from the date of this decision. See C. J. Langenfelder & Sons, Inc., supra, at pages 34-35.

Finally, we consider the SAA contention that Appellant failed to mitigate damages by not utilizing its June 1976 plan to partially assemble the space frame off-site and erect it by placing a crane on the elevated roadway. Not only has the Board determined that the complete space frame could not have been erected in this manner, but the SAA has failed to produce any evidence indicating the extent to which damages might have been diminished by such a procedure. Since the SAA had the burden of proving any reduction in damages, its failure to do so precludes further consideration of this issue by the Board. <u>Kruvant v. Dickerman</u>, 18 Md. App. 1, 305 A.2d 227 (1973); 25A C.J.S. Damages, § 144e.

For the reasons set forth herein, Appellant's appeal is sustained and remanded to the SAA Administrator for additional negotiation and payment.

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