ARMED SERVICES BOARD OF CONTRACT APPEALS

Appeal of --	)	
	)	
Dan Rice Construction Co., Inc.	)	ASBCA No. 52160
	)	
Under Contract No. NAS10-11924	)	

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OPINION BY ADMINISTRATIVE JUDGE JAMES

This appeal arises from the final decision of the National Aeronautics and Space Administration ("NASA") contracting officer ("CO") denying the $517,000 claim of Dan Rice Construction Co., Inc. ("DRC"), which sponsored, and added general and administrative ("G&A") costs and profit to, the claim of its vertical lift door ("VLD") subcontractor Carco Industries, Inc. ("Carco"). The Board has jurisdiction of this appeal under the Contract Disputes Act of 1978, 41 U.S.C. § 607. After a three-day hearing in Kissimmee, Florida, the parties submitted post-hearing and reply briefs. The Board decides entitlement only.

FINDINGS OF FACT

1. NASA's Kennedy Space Center ("KSC") awarded Contract No. NAS10-11924 ("contract 11924") to DRC on 16 June 1992 to construct a "Payload Spin Test Facility - Replacement" ("facility") at KSC for the firm, fixed price of $6,958,220 in accordance with specification No. 79K33356, Rev. A, dated 3 March 1992 ("specification"), and drawing No. 79K33355, Rev. A, dated 10 January 1992 ("drawing") (R4, tab 1 at 1-2).

2. Specification § 08365, "VERTICAL LIFT DOORS," provided in pertinent part:

1.3 SUBMITTALS

. . . .

SD-04 Drawings

Complete detailed fabrication and installation drawings covering exterior mounted, electrically operated vertical lift doors shall be submitted for approval. Drawings shall indicate construction details, clearance requirements, locations for electrical vacuum and compressed air tie-ins, metal gages, finish, locations of all access panels, electrical requirements, design and wind load data. Submittal to include wiring diagrams.

SD-13 Certificates

Certificates of Compliance for wind load and air infiltration shall be submitted for each door proposed for use. . . .

. . . .

1.4 Performance Requirements

Doors shall be designed to withstand a windloading pressure of at least 48 pounds per square foot with a maximum deflection of L/120 of the span. . . .

PART 2 PRODUCTS

2.1 EXTERIOR MOUNTED TYPE I VERTICAL LIFT DOORS

General requirements: The exterior mounted, electrically operated, [VLDs] shall be as specified herein and as detailed on the drawings. Doors shall be furnished complete with all hardware, guides, seals, control and accessories as required for a complete installation. Provide access ports of adequate working room size to access all maintainable components.

. . . .

2.1.2 Door Construction

Door frames (leaves) shall be constructed on standard structural steel sections of ample size and strength for loads and stresses imposed under the specified conditions. Frames shall be of welded construction and all joints shall develop the full strength of the framing members . . . . Door frame shall not be . . . out of line by more than ? -inch in 20 feet . . . . Provide Zinc Rich compound primer on all exposed metal surfaces.

2.1.3 Formed Plate Door Guide

Door guide assemblies shall consist of a series of galvanized structural shapes and arranged as shown on the plans. Guide assemblies shall be fabricated for field bolting or welding to the structural framing as required for a rigid installation. Minimum thickness of the door guide angles shall be 3/16-inch.

2.1.4 Counterweights

Steel plate sectional counterweights shall be provided to properly balance door leaves for easy operation. . . . The counterweight shall be contained in a steel plate box which is suspended on cables attached to the doors operating over cast iron sheaves. Counterweight box shall be guided throughout the full height of travel by a counterweight enclosure (tower) with internal guides. . . .

2.1.5 Weatherhood Framing

Door manufacturer to provide all weatherhood structural framework, roof deck, girts, clips, and fasteners. Weatherhood brake metal and trim is to be furnished and installed by wall panel manufacturer.

. . . .

2.1.6.1 Guide Rollers

The doors shall have a minimum of eight anti-friction bearing guide rollers per panel. Two guide rollers at each corner shall engage single angle steel door guides

and guide the panels up and down. The guide rollers shall be of sufficient size to transmit the windload from the door panel to the steel door guides. Metal to metal sliding guides will not be allowed.

2.1.6.2 Cable System

Leaves shall be placed one behind the other with vertical travel so arranged that all leaves shall start to move at the same time, travel at differential speeds and arrive at their fully opened or closed position simultaneously. Provide all necessary wire rope, sheave assemblies, and fittings to make this system operable. Panel sheaves shall be mounted on the interior of the panel with easy access by 'one man' removable covers . . . .

2.1.6.3 Weathering

Special pneumatic seals to be installed . . . to meet specified criteria. Air leakage shall meet or exceed requirements for Class 100,000 Clean Room. . . . Corners of seals shall be molded to form bounded corners. [S]eals shall be held in place by extruded aluminum retainers and shall be anchored to an adjusting angle with stainless steel screws set in caulking and spaced at intervals of 6 inches. . . . Additional weatherstripping shall be provided by the door manufacturer at the head, sills, and jambs of the doors. Provide a 14 gage minimum dust shield attached to top of the top door leaf to seal door pocket when door is in closed position. . . .

2.1.6.4 Operation of Seals

. . . This door control [electrical and mechanical controls] shall be provided by the door manufacturer.

2.1.6.5 Operating Unit

Doors shall be suspended on wire ropes reeved from leaves over traction sheaves to counterweights. Traction sheaves shall be driven by floor level mounted motor operators with auxiliary hand crank operation. . . . The

power operator shall be designed such that the gear motor may be removed . . . without affecting the emergency auxiliary operators. Provisions shall be made for immediate emergency manual operation of door in the event of electrical failure. The emergency operating mechanism shall be arranged such that it can be placed in and out of operation from the floor . . . .

Manual operation shall be by means of a hand crank connected to the drive system by a roller chain drive. A manual interlock switch shall be provided to disconnect the motor when the manual operating hand crank is engaged. . . .

. . . .

2.1.6.7 Pushbuttons

Explosion proof pushbuttons shall be . . . the three-button type, with the buttons marked “OPEN”, “CLOSE”, and “STOP”.

The “OPEN” button shall [require] only momentary pressure by the operator to cause the door to go from the closed to the fully open position. The “CLOSE” button shall require constant pressure from the operator to maintain the closing motion of the door. When the door is in motion and the “STOP” button is pressed, the door shall stop instantly and remain in the stop position . . .

. . . .

2.1.7 Shop Painting

All structural steel surfaces shall be shop painted with one shop coat of Zinc Rich compound primer in accordance with KSC-STD-C-001. All exposed surfaces shall be field painted following erection in accordance with specification Section 09901.

. . . .

2.1.10 Electrical Work

All wire, conduit, junction boxes, seal-offs, electrical disconnects, field wiring, and mounting of all electrical controls by Division 16. The door manufacturer shall furnish all the controls (control panel, pushbuttons, limit switches, take-up reel, coil cord, etc.).

. . . .

3.1 INSTALLATION

. . . .

Door acceptance is contingent on final operational tests run on all door components . . . .

(R4, tab 1) We find that specification § 08365, ¶¶ 2.1.2, 2.1.6.1, 2.1.6.2, 2.1.6.3 and 2.1.6.5, used the terms "leaf," "frame," and "panel" interchangeably to designate the same VLD component.

3. Specification § 09901, "ARCHITECTURAL PAINTING," provided in part:

3.5 PAINT SCHEDULE

SURFACE	PRIMER	FINISH COAT . . .
. . . .		
Interior metal	Inhibitive acrylic primer	Semi-gloss enamel
. . . .		

Separation of dissimilar metals one coat of Bituminous paint

We interpret the last quoted phrase to mean that the contractor was to apply one coat of bituminous paint in order to separate dissimilar metals. Paragraph 3.6 specified the exterior and interior surfaces to be primed and painted, but did not include the interior, non-exposed surfaces of the counterweight towers or analogous structures. (R4, tab 1)

4. The drawing's sheet A-3 depicted three-panel, VLD 102C on the west, and four-panel VLD 101B on the east, sides of the facility and its sheet A-18, door schedule, listed 28' x 42' steel VLD 101B and 20' x 15' steel VLD 102C (R4, tab 1).

5. The drawing's plans on sheet A-1 depicted a generally rectangular building with walls oriented to the cardinal compass points, VLD 101B extending outward from the east wall's plane, and VLD 102C extending outward from the west wall's plane, to enclose their parallel, adjoining panels. On the area outside (east) of VLD 101B, was an arrow note stating "FUTURE AIRLOCK." Four to five feet south of VLD 101B was door 101C. General Note No. 11 stated: "COAT DISSIMILAR METALS WITH (1) COAT OF BITUMINOUS PAINT OR OTHER APPROVED MATERIAL." (R4, tab 1)

6. The drawing's "Building Section BB" on sheet A-4 depicted VLD 101B with arrow notes "VERTICAL LIFT DOOR ENCLOSURE BY DOOR MFR." indicating a 14' 6" to 16' high structure above the VLD opening to enclose the VLD in its open position, abutting the "BRAKE MTL HOOD MATCHING WALL PANELS BY SIDING MFR." indicating an inclined surface atop the VLD enclosure (R4, tab 1).

7. The drawing's "Section B" in sheet A-6 depicted VLD 102C with arrow notes "FASCIA FRAMING BY DOOR MFR" and "PANEL TRIM BY DOOR MFR" at the VLD enclosure, and "CONT. DUST SHIELD BY DOOR MFR." indicating a shield atop the VLD panels and extending to the facility wall (R4, tab 1).

8. The drawing's sheet A-20 depicted the following pertinent VLD 101B characteristics: (a) "BRAKE METAL HOOD BY WALL PANEL MFR." an inclined surface atop a ½" metal deck situated above the drive sheave assembly, consisting of four sheaves of equal diameter on an axle aligned above each door panel, (b) "FRAMING BY DOOR MFR. SPACING 7' 0" MAX." and "WALL GIRTS BY DOOR MFR" within the 14' by 4' by 28' weatherhood abutting the brake metal hood and enclosing the VLD's mechanical hoisting devices, (c) "DUST SHIELD BY DOOR MFR - 14 GA MIN" abutting the top of the upper panel and extending to the facility wall, (d) "SILL TRIM BY PANEL MFR" at the base of the VLD enclosure wall, (e) "PNEUMATIC SEALS" at panel junctures, (f) "BOTTOM LEAF DOOR SAFETY EDGE SEAL BY DOOR MFR." and "? " NEOPRENE WEATHERSTRIPPING WITH CONT FLAT BAR RETAINER" attached to the lower edge of the inner panel and extending outwards in a quarter-circle, within which was the "DOOR BOTTOM SAFETY EDGE/SEAL" atop the floor slab, (g) two towers, open at the top and bottom, each 4' x 3' 5" x 56' 6" (from which dimensions a surface area of 838.08 square feet can be calculated), "COUNTERWEIGHT TOWER BY DOOR MFR.," adjoining the two vertical sides of the VLD panels and enclosure abutting the structure's "face of wall girt," and 18" from the wall's structural column, and (h) horizontally oriented, dual roller bearings mounted on the VLD panels' vertical end plates, and engaging the protruding flange of the "L" cross-sectional door guide affixed to the door frame (R4, tab 1).

9. The drawing's sheet A-20 depicted the following pertinent VLD 102C characteristics: (a) "FRAMING BY DOOR MFR. SPACING 7' -0" MAX." within the 10' by 3' by 20' weatherhood enclosing the VLD's mechanical hoisting devices and abutting the roof deck, (b) "DUST SHIELD BY DOOR MFR (14 GA MIN)" abutting the top of the upper panel and extending to the facility wall girt, (c) "SILL FLASHING BY PANEL MFR" at the base of the VLD enclosure wall, (d) "PNEUMATIC SEALS BY DOOR MFR" at the panel junctures, (e) "BOTTOM LEAF DOOR SAFETY EDGE SEAL BY DOOR MFR." and "? " NEOPRENE WEATHERSTRIPPING WITH CONT[INUOUS] FLAT BAR RETAINER" attached to the exterior bottom edge of the inner panel and extending outwards in a quarter-circle, within which was the "DOOR BOTTOM SAFETY EDGE/SEAL" abutting the floor slab, (f) two towers, open at the top and bottom, each 2' 10" x 1' 4" x 25' (from which dimensions a surface area of 208.17 square feet can be calculated), "COUNTERWEIGHT TOWER BY DOOR MFR.," adjoining the two vertical sides of the VLD panels and enclosure abutting the structure's "face of wall girt" and 6" from the wall's structural column, and (g) horizontally oriented, dual roller bearings mounted on the VLD panels' end plates and engaging the protruding flange of the "L" cross-sectional door guide affixed to the door frame. The NASA drawing did not depict vertical mechanical drive enclosures adjacent to the counterweight towers for VLDs 101B and 102C. (R4, tab 1)

10. Contract 11924 included the following pertinent clauses: (a) KSC 52.236-106 INTERFERENCES AND COORDINATION OF WORK (FEB 1991), required the contractor to coordinate construction layout, systems configuration and work scheduling to avoid interferences between construction trades and their installations; (b) KSC 52.243-90 AUTHORIZED CHANGES (FEB 1990), provided that only the CO or "his duly authorized representative" was authorized to issue instructions to the contractor on contractual matters, and the CO was to furnish the written identification, scope of authority and duties of such representatives to the contractor; (c) KSC 52.236-111 SHOP DRAWINGS (AUG 1991), required NASA to review and return to the contractor its shop drawing submittals within 15 calendar days after their submission, provided that the "Contractor shall be responsible for the dimensions and design of adequate connection details" and required approval of the contractor's shop drawing submittal by the CO; (d) KSC 18-52.242-70 TECHNICAL DIRECTION (MAR 1989), required DRC to give the CO written notice within five days after receiving technical direction deemed a change; and (e) FAR 52.243-4 CHANGES (AUG 1987), provided similar notice of change duties (R4, tab 1 at 7, 22, 25, 29, 75, 83).

11. DRC provided Carco the KSC facility plans and specifications, including § 08365 (tr. 50-52, 101-02), which DRC and Carco viewed as a performance-type specification (tr. 60-61, 229-30).

12. We find that contract 11924's: (a) drawings in the Board record contained some dimensions and were scaled except for those marked "NTS" (not to scale) and the electrical notes (R4, tab 1) and (b) VLD specifications and drawings were based on the

double pick design of Electric Power Door Co. (EPDC), but permitted either a single or a double pick (hoisting cable) design (R4, tab 77, ex. 3 at 9-10, 17; tr. 283, 822; gov't br. at 19), set forth the configuration and overall dimensions of VLDs 101B and 102C, did not contemplate "off-the-shelf" VLDs, and required DRC to submit detailed fabrication and installation drawings with design and wind load data for the VLDs and their components for NASA's approval as conforming to contract requirements.

13. DRC and Carco entered into a "Purchase Order," dated 20 May 1992, for "LOT . . . VERTICAL LIFT DOORS 08365," to be delivered by 1 January 1993 to the KSC Payload Spin Test Facility for the price of $97,000.00 "AS PER PLANS & SPECIFICATIONS" (R4, tab 35), meaning NASA's plans and specifications (tr. 55).

14. (a) The CO's 10 July 1992 letter advised DRC of contract NAS10-10600 with "Base Operations Contractor, EG&G Florida," whose field engineer John Tyler was authorized to observe the construction contractor's operations under NASA contract 11924 with DRC, to inspect work in progress, to observe all contractor tests, to identify technical problems, and to record and report deficiencies and nonconformances, but excluded authority to "execute, agree to execute, or agree in principle to any change, revision, or modification of the contract" or to "issue directions or instructions to the contractor which constitute a change in contract work scope, schedule, or cost." (Ex. G-6) (b) On 16 July 1992 NASA sent DRC a NASA Form 1634 Delegation for the CO's technical representative (COTR) Donald Minderman, whose authority included reviewing and verifying DRC's work, interpreting technical requirements of the contract or specifications, and referring differences of opinion to the CO for resolution, and excluded authority to change the statement of work or specifications (ex. G-1; tr. 551-52, 556). (c) DRC's undated "NOTICE TO ALL SUBCONTRACTORS" advised Carco of several provisions of contract 11924, including the KSC 52.243-90 "AUTHORIZED CHANGES" clause (see finding 10) (R4, tab 77, aff. of Steven R. Cretens, ¶ 17, ex. 4).

15. DRC's detailed fabrication and installation drawing submittals for the VLDs and NASA actions thereon were as follows:

Subm. No.	Date	NASA Action	Review Date	Days > 15	Folder 4, Tab
36	9-7-92	Not approved	9-11-92	0	A
36A	9-28-92	Not approved	10-16-92	3	B
36B	12-1-92	Not approved	12-22-92	6	C
36C	1-19-93	Not approved	1-27-93	0	D
36D	3-1-93	Not approved	3-29-93	13	E
36E	4-21-93	Approved in part, returned for correction	5-20-93	14	F
36F	5-3-93	" " "	5-20-93	2	G

36G	6-11-93	Approved as noted	6-28-93	2	H

The foregoing eight submittals were signed "not approved" or "approved in part" or "approved as noted" not by the CO, but instead by the CO's Representative (COR) Donald Minderman or Schonda Briggs. (R4, folder 4, tabs A-H; tab 77, ex. 5) We find that the CO delegated submittal approval and disapproval authority to the COR.

16. DRC's 27 May 1993 letter and 20 September 1993 letter (reviewed by COR Minderman) to the CO asserted that by its VLD submittal reviews NASA delayed VLD design drawing approval and added VLD features not required by the contract specification and drawing (R4, tab 31, app. 11; R4, tab 65). COTR Minderman, "the eyes and ears" of the CO, "processed" the VLD shop drawing submittals (tr. 552; R4, tab 79 at 82-85, 91-92). Jeff Miller, NASA's "Construction Monitor," and others prepared and signed NASA's "Daily Log of Construction" throughout performance of contract 11924 including recording facts relating to the alleged VLD changes and additions (R4, tabs 5, 37).

17. On 13 May 1994 NASA terminated contract 11924 for default (R4, tab 13). In April 1995 Carco sued DRC and its surety Aetna Casualty and Surety Co. in the U. S. District Court, M.D., Florida, in a lawsuit styled "United States for the Benefit of Carco Industries, Inc. v. Dan Rice Construction Co. . . . and Aetna Casualty and Surety Company . . . Case # 95-CV-344," alleging breach of contract with respect to Carco's subcontract under DRC's prime contract with NASA (R4, tab 77 at 1-2).

18. On 11 January 1996, during the lawsuit, Carco submitted a 36 item, $474,273.07 claim against DRC (R4, tab 77, Feldman aff., ¶¶ 10, 14, exs. D-E). In November 1996 Carco and DRC executed a "Settlement Agreement" in Case # 95-CV-344 which provided that Carco was to be paid $75,000.00 and was to execute a release "in favor of Defendant Aetna" (but not in favor of defendant DRC), and –

> 4. Plaintiff [Carco] shall file a claim for equitable adjustment against NASA to recover the additional costs it incurred in performing the work on the Vertical Lift Doors. Plaintiff's claim for equitable adjustment shall be based upon Plaintiff's claim analysis . . . . Defendant Dan Rice . . . shall file all documents necessary to sponsor Plaintiff's claim against NASA for equitable adjustment, and shall cooperate with Carco in the prosecution of said claim. DRC shall have the right to add its markup for G&A and Profit to the Plaintiff's claim . . . .

Carco agreed to reimburse up to $75,000.00 to Aetna from any recovery it might receive in resolution of the equitable adjustment claim against NASA, and DRC agreed to assign to Aetna all funds DRC should recover from NASA through such claim. (Ex. A-7)

19. On 4 September 1998 DRC submitted Carco's 28 July 1998 claim to the CO with DRC's and Carco's CDA certifications. Carco's claim alleged 36 added scope changes and delays of 148 and 218 calendar days in two periods from 25 June to 19 November 1993 and from 3 December 1993 to 9 August 1994. The alleged operative facts underlying the alleged changes arose between 7 September 1992 and 14 January 1994. Carco's "DAMAGE QUANTUM" stated:

> Carco funded the balance of its costs . . . to complete its contractual obligations in the amount of $542,781.59. Adding profit of 10%, less the above payments [adding to $122,786.68] the total amount needed to make CARCO whole is the sum of $427,273.07.

DRC added markups of $42,727 for G&A (10% of Carco's $427,273 amount) and $47,000 for profit (10% of subtotal), for a combined total of $517,000. (R4, tab 31)

20. The CO's final decision of 2 February 1999 stated that neither DRC nor Carco provided timely notice to the CO or to his COTR of any VLD work outside the scope of the contract, denied DRC's claim on its merits and determined that DRC owed NASA $8,127 "for excess shop drawing review costs" (R4, tab 32). On 28 April 1999, appellant timely appealed from that CO's final decision to the ASBCA. The parties settled NASA's $8,127 claim on 20 March 2000 (ex. A-7 at 14-15; tr. 92). Our following findings and decisions address Carco's 1998 claim items.

21. Item 1. (a) Carco's claim alleged that NASA "mandated" the addition of roller bearings to the VLD panels so as to make the doors travel with no rotation or racking of the frames as the doors and counterweights traveled up and down (R4, tab 31). (b) VLD drawing submittal No. 36, sheets E3 and 1, depicted the VLD guide roller as configured in the NASA drawing, sheet A-20, *viz*., horizontally oriented, dual roller bearings mounted on the VLD panel end plates and engaging the projecting flange of the door guide, and depicted two hoisting pads, one at each upper, outer corner of each VLD panel, *i.e*., a "double-pick" design (R4, folder 4, tab A; tr. 280-83). (c) VLD submittal No. 36A, sheets E6 and 1, depicted a single hoisting pad atop the center of each VLD panel, *i.e*., Carco switched to a "single-pick" design. NASA disapproved that submittal and commented:

> We are very skeptical about the panels only being lifted at one point in the center of each panel. . . . We are concerned mainly because there is nothing to prevent the door panel from rotating in the opening until the sides of the door panel rub against the sides of the track towers or guide angles. This not only will cause wear and tear, it could also cause the inflatable seals to become misaligned.

(R4, folder 4, tab B at 2) Carco's president admitted that a single pick door, if not perfectly balanced, can lean and may rub against the door guides (tr. 282). (d) VLD submittal No. 36D, sheets 22 and E17, depicted guide rails engaging a roller assembly bolted to the end plates of the VLD panels, which assembly included dual roller bearings (as first proposed), beneath which was added a single, vertically oriented, cam roller whose axis was parallel to the inner guide rail. NASA approved that changed roller bearing configuration in submittal Nos. 36F and 36G. (R4, folder 4, tabs E, G-H).

DECISION

We believe it is helpful first to review several legal issues that arise in all or most of the claims. To recover for a constructive change, a contractor must prove that: (1) the CO compelled the contractor to perform work not required under the terms of the contract, (2) the person directing the change had contractual authority unilaterally to alter the contractor's duties under the contract, (3) the contractor's performance requirements were enlarged, and (4) the added work was not volunteered, but resulted from the direction of the government's officer. *See Len Company and Associates v. United States*, 385 F.2d 438, 443, 181 Ct. Cl. 29, 38 (1967).

With respect to change element (2), NASA argues that the delegations of authority to EG&G inspector John Tyler and COTR Donald Minderman expressly prohibited authority to make contract changes (finding 14), so NASA is not liable for any directions they gave to DRC or to Carco, citing *Allen's of Florida, Inc.*, ASBCA No. 14656, 71-1 BCA ¶ 8646 (contract expressly prohibited inspector to change the specification without the CO's written permission).

John Tyler, NASA's designated inspector, was delegated responsibility to inspect work in progress, to identify technical problems and to report technical deficiencies and nonconformities (finding 14(a)). When he misidentified a problem, deficiency or nonconformity and thus required DRC to perform added or different work, such action constructively changed the contract. *See A & D Fire Protection, Inc.*, ASBCA Nos. 53103, 53838, 02-2 BCA ¶ 32,053 at 158,448 ("A contractor is entitled to an equitable adjustment [for] a constructive change when required to perform more or different work not called for under the terms of its contract as a result of a Government inspector's misinterpretation of specifications."); *Allstate Leisure Products, Inc.*, ASBCA No. 35614, 89-3 BCA ¶ 22,003 at 110,623 (QAR's erroneous interpretation of inspection standards was a constructive change).

Contract 11924 required approval of the contractor's shop drawings by the CO (finding 10(c)). Appellant's eight VLD submittals were signed "not approved" or "approved in part" or "approved as noted" not by the CO, but rather by the CO's representatives (COR) Donald Minderman or Schonda Briggs. We have found that the CO delegated his submittal approval and disapproval authority to the COR. (Finding 15)

NASA argues that DRC did not notify the CO that added work resulting from submittal reviews and site inspections was a constructive change. Contract 11924's Technical Direction clause required the contractor to give the CO written notice within five days after receiving technical direction deemed a change, and its FAR 52.243-4 Changes clause required similar notice (finding 10(d), (e)). DRC's 27 May 1993 and 20 September 1993 letters notified the CO and COTR Minderman of changed and added VLD features resulting from NASA's submittal reviews (finding 16). Express or implied directions by government inspectors for alleged VLD changes and additions occurred from 23 July 1993 to 14 January 1994, and were recorded in NASA's "Daily Log of Construction" signed by its "Construction Monitor" Jeff Miller (finding 16).

The purpose of notice provisions is to enable government officials to begin to collect data on increased costs and to evaluate the desirability of continuing the activity of which the contractor complains. Therefore, a—

> severe and narrow application of the notice requirements . . . would be out of tune with the language and purpose of the notice provisions, as well as [the] wholesome concern that notice provisions in contract-adjustment clauses not be applied too technically and illiberally when the Government is quite aware of the operative facts.

Hoel-Steffen Construction Co. v. United States, 456 F.2d 760, 766-68 (Ct. Cl. 1972), cited in *Grumman Aerospace Corp.*, ASBCA Nos. 46834 *et al*., 03-1 BCA ¶ 32,203 at 159,185-86.

Lack of written notice did not prejudice the government when the government inspector knew of the contractor's complaint of extra work, and reported such facts in his daily reports to his superior, the base engineer, and so the persons directly responsible were aware of the operative facts of a contractor claim. *See Davis Decorating Service*, ASBCA No. 17342, 73-2 BCA ¶ 10,107 at 47,475. The government had constructive notice of a change claim when its inspector's Daily Inspection Log noted that the contractor was removing floor tile, the subject of its claim. *See Central Mechanical Construction*, ASBCA Nos. 29431 *et al*., 85-2 BCA ¶ 18,061 at 90,656-57. When the government's resident engineer saw a pool of water near a mechanical room, the government had notice of the operative facts and the Changes clause notice requirement was satisfied. *See C. M. Lowther, Jr*., ASBCA No. 38407, 91-3 BCA ¶ 24,296 at 121,405. Notification of conflicting water and sewer line subsurface elevations to the government's project and resident engineers gave them the opportunity to investigate the assertion and to order alternative corrective action, and so satisfied the Changes clause notice requirement. *See A. R. Mack Construction Co., Inc.*, ASBCA No. 50035, 01-2 BCA ¶ 31,593 at 156,139-40.

In the case at bar, COTR Minderman processed all VLD submittals and knew of the changed and added work induced by the notes and comments of NASA's reviewers on those submittals. In the role as COR, either Mr. Minderman or Schonda Briggs disapproved and then eventually approved the VLD submittals by authority delegated by the CO (finding 15). Their knowledge of the operative facts of the changed and added work induced by the submittal reviewer's notes and comments satisfied the contract's notice requirements. *Hoel-Steffen, Lowther, supra*.

We next analyze whether the constructive change elements set forth above have been proven for each of Carco's claims.

Item 1. Appellant's first submittal configured the VLD roller guides as in the NASA drawing (finding 21(b)). Specification § 08365, ¶ 2.1.6.1, specified "a minimum of eight . . . bearing guide rollers per panel" and did not set a maximum number of bearing guide rollers (finding 2). Carco's president admitted that a single pick VLD, if not perfectly balanced, can lean and may rub against the door guides (finding 21(c).[1] Therefore, addition of the cam roller to each guide roller assembly was a result of Carco's single pick design choice, and was not a constructive change.

FURTHER FINDINGS OF FACT ON CLAIM ITEMS 2 AND 3

22. (a) Carco's claim alleged that the outer dimensions of the VLD 102C and VLD 101B counterweight towers in NASA's "design drawings" did not allow for a large enough counterweight to equalize the weight of the doors; had Carco used the indicated tower dimensions of VLD 102C, its counterweights would have extended six feet below the facility's finish grade to allow for the amount of travel needed to open the door fully, which would have collected water, changed the building's foundation design, and required construction of several pits and sump areas; and so, Carco had to increase the tower sizes (R4, tab 31). (b) The contract drawing did not state the counterweight's dimensions or weight or the VLDs' weights (R4, tab 1). (c) VLD submittal No. 36A, sheet 4, first depicted two 3' x 4' x 53' 3-7/16" counterweight towers, one on each side of VLD 101B, and two 3' 1" x 1' 4" x 20' 9¼" counterweight towers, one on each side of VLD 102C (R4, folder 4, tab B). (d) VLD submittal No. 36C, sheets 15 and 16, depicted counterweights for VLDs 101B and 102C, but did not state their weights (R4, folder 4, tab D). (e) Approved VLD submittal No. 36G, sheet E-4, depicted two 3' x 4' x 54' (768 square foot) counterweight towers, one on each side of VLD 101B, and two counterweight towers 3' 1" x 2' x 21' 8" (226.39 square foot), one on each side of VLD 102C (R4, folder 4, tabs E-F, H). (f) We find that Carco's VLD 101B counterweight towers were shorter in height and about 140 square feet (838 ft.^{2} (NASA) - 768 ft.^{2} (Carco) x 2) smaller in surface area than

[1] Carco did not propose "metal to metal sliding guides" forbidden by specification ¶ 2.1.6.1, so NASA's argument based on that requirement (gov't br. at 20) is not relevant to the issue of VLD rotation.

NASA's drawing dimensions, and its VLD 102C counterweight towers were shorter in height and about 36.44 square feet (226.39 ft.^{2} (Carco) - 208.17 ft.^{2} (NASA) x 2) larger in surface area than the NASA drawing dimensions, for a combined difference of 103.56 square feet smaller in surface area than NASA's specified tower dimensions (140 sq. ft. - 36.44 sq. ft.) (see findings 8(g), 9(f) for surface areas calculated from NASA drawing).

DECISION

Appellant's counterweight towers, as approved, were smaller, not larger, than those shown on the NASA drawing (findings 8(g), 9(f), 22), so appellant failed to prove its major factual premise. We hold that no constructive changes occurred.

FURTHER FINDINGS OF FACT ON CLAIM ITEM 4

23. (a) Carco's claim alleged that the east door (VLD 101B) had to be relocated north of its specified location due to the interference of personnel door (101C) with the "newly sized" VLD frame (claim item 3), since NASA refused to relocate door 101C and required Carco to "re-engineer and modify the door erection, tie-ins, and surrounding structure" to provide clearance for door 101C (R4, tab 31). (b) According to Scott Feldman, Carco's president, because NASA refused to allow Carco to move door 101C two feet to accommodate the allegedly "increased" size of the counterweight tower for VLD 101B, Carco had to reverse the position of its proposed mechanical drive enclosure, adjacent to the counterweight tower, from the left to the right side of VLD 101B (tr. 290-91, 608-09). (c) VLD submittal No. 36D, sheet E-4, first added a mechanical drive enclosure (not depicted in the NASA drawing, finding 9) to the left of the north counterweight tower of VLD 101B (looking *east*), and its approved submittal No. 36G, sheet E-4, also showed the mechanical drive enclosure to the left of the north counterweight tower of VLD 101B (looking *east*) (R4, folder 4, tabs E, H). (d) As installed, Carco's mechanical enclosure is to the left of VLD 101B's north counterweight tower (looking *east*) (R4, tab 81, photos 2-4, 6, 8; tr. 607-08, 673). (e) We find that Carco's VLD 101B counterweight towers were first proposed and remained 3' x 4' (findings 22(c), (e)), its submittal drawings did not depict the north-south position of VLD 101B with respect to the facility's east wall or any relocation of VLD 101B to the north, and, despite Mr. Feldman's foregoing testimony, Carco drawings and as-built photographs showed no reversal of the position of VLD 101B's mechanical drive enclosure.

DECISION

Contrary to the testimony of Carco's president, appellant's drawings and photographs of VLD 101B as installed do not show that it was relocated north of its specified location, or that the position of its mechanical drive enclosure for VLD 101B was reversed (finding 23(c), (d)). We hold that no constructive change was proven.

FURTHER FINDINGS OF FACT ON CLAIM ITEM 5

24. (a) Carco alleged that NASA "mandated" an increase in the size of Carco's proposed VLD "sensing edge"; added custom fabricated, mounting brackets; required angled weatherstripping at the bottom of the VLDs "to assure the strip would always fall outside of the door and not roll under the edge of the door"; and added limit switches near the door motor so "that the door and counter weight were both outfitted with limit switches" (R4, tab 31). (b) VLD submittal No. 36A, sheet E2, first depicted a section of ? " by 4" neoprene weather stripping configured in a quarter-circle extending to the outside of the door and attached to the door bottom with a flat bar retainer, as in NASA drawing sheet A-20 (R4, tab 1, folder 4, tab B, sheet E2; tr. 292, 294-95). (c) VLD submittal No. 36G, sheet E-2, Detail 1, depicted a section of a "formed seal 1/8" thick x 29' 0" lg. [long] weather stripping" attached and configured as in its previous submittal (R4, folder 4, tab H). (d) Carco manufactured the VLDs with straight, vertical weather stripping (tr. 294) that did not conform to the contract drawing, sheet A-20, nor to its approved submittal drawing, sheet E-2. (e) An unidentified NASA field representative raised the concern that the weather stripping could roll inside the door's bottom edge, instead of outside as specified (tr. 295-96). (f) Carco eliminated the flat bar retainer and substituted a two-sided angular steel strip, on one leg of which it mounted the weather stripping, which, when attached to the door bottom, forced the weather stripping to face about 30? to the outside of the door edge. This alteration required patching previous screw holes, surface blasting to SP-5, repainting with inorganic zinc (primer), and drilling, tapping and reattaching the weather stripping, which Carco completed on about 4 January 1994 (R4, tab 5, daily log # 429; tr. 297-98). (g) Carco introduced no proof of any increase in the size of the VLD "sensing edge" and added limit switches (tr. 725-26), which sub-items we find Carco abandoned.

DECISION

Appellant's weather stripping was not configured to extend outside of the VLD panel, conforming to the NASA drawing and its approved submittal No. 36G. To cure that nonconformity, appellant eliminated the flat bar retainer and added a mounting strip configured to make its weather stripping conform by facing about 30º to the outside of the door edge (finding 24(b)-(f)). We hold that no constructive change was proven.

FURTHER FINDINGS OF FACT ON CLAIM ITEM 6

25. (a) Carco alleged that NASA "forced" Carco to devise a "fail safe system" to prevent VLDs 101B and 102C from falling, and to remain operable by hand cranking, if a cable or pin failed, which direction "left Carco with the only option of using a redundant completely operational duplicated cable system," and doubled the number of cables, sheaves and associated components (R4, tab 31). (b) On 2 January 1993 NASA asked Carco what would keep the VLD from falling in case a cable broke (a mechanical failure) (R4, tab 45; tr. 303). (c) VLD submittal No 36C added drawing sheets E-20 and E-21,

depicting a "fail safe arrangement" with respect to the cable drums and gear motor installed in the base of the counterweight towers (R4, folder 4, tab D), in which it included "throw-out counterweights, or bearings" that would act like a clutch, if the door started to travel past a certain speed, and would slow down and stop the door in case its cable broke (tr. 303). (d) NASA rejected that "fail safe" design on the basis that the VLD had to remain functional if a cable broke (tr. 303-04). (e) VLD submittal Nos. 36F, sheet E13, and 36G, sheet E11, respectively, redesigned dual "fail safe" sheaves and cables for each panel of VLDs 101B and 102C (R4, folder 4, tabs G-H; tr. 303-05).

DECISION

Specification § 08365, ¶ 2.1.6.5, required "immediate emergency manual operation of door in the event of electrical failure," but did not require any "fail safe" operational capability of the VLDs in the event of a mechanical failure, such as a broken wire cable (finding 2). We hold that NASA's rejection of appellant's clutch design solution, and insistence upon fail safe operational capability with sheaves and cables (finding 25(b), (d), (e)), constituted a constructive change.

FURTHER FINDINGS OF FACT ON CLAIM ITEMS 7 AND 8

26. Item 7. (a) Carco alleged that it proposed a "channel system" for VLD 101B's weatherhood, but NASA "forced" Carco to re-design a "complete tube steel girt system . . . to provide a much stiffer framing header" in order to obtain NASA's "final design approval" (R4, tab 31). (b) For VLD 101B, VLD submittal Nos. 36 (double pick design) and 36A (single pick design), sheets E1 and E2, depicted four girt frames measuring 27' 3" by 6' 3? " arranged in a 14' 6" elevation and composed of 8" by 8½" three-sided members attached to "I" beam columns at grid line intersections 9C and 9D. (c) NASA's comments on submittal No. 36A asked DRC to "[p]rovide calculations on support beam at the top of the . . . counterweight tower." (R4, folder 4, tabs A, B at 4) NASA questioned whether the girt frame had sufficient stiffness (tr. 306). (d) The dual sheaves and cables Carco added to VLD 101B (finding 25(e)) required added sheave and chain drives and gear motors (finding 51, *infra*; tr. 307). (e) VLD submittal No. 36E, calculated a girt frame deflection of 1.47" in 39' 11", not conforming to specification § 08365, ¶ 2.1.2, and sheets E-1 and 7, resized the girt frames to 40' 8" by 6' 7¼" arranged in a 19' 6" elevation, and composed of 8" by 8" rectangular tubes due to the added fail safe, sheave and chain drives and gear motors (R4, folder 4, tab F at 3, 9-10; tr. 307).

27. Item 8. (a) Carco alleged that NASA "forced" Carco to revise its proposed girt header design for VLD 102C to a "truss system" so as to provide a stiffer frame and "to promote shop drawing approval" (R4, tab 31). (b) For VLD 102C, submittal Nos. 36 (double pick) and 36A (single pick), sheets E1 and E3 depicted three girt frames measuring 25' by 4', arranged in a 10' elevation, and composed of 8" by 8½" three-sided members attached to the structure's "existing" beam and columns at grid line 1 (R4, folder 4, tabs A-

B). (c) NASA's comments on submittal No. 36A asked DRC to "[p]rovide calculations on support beam at the top of the . . . counterweight tower." (R4, folder 4, tabs A, B at 4) and questioned whether the girt frame had sufficient stiffness (tr. 316). (d) The dual sheave and cable system Carco added to VLD 102C (finding 25(e)) required additional mechanical devices (tr. 315-16). (e) VLD submittal No. 36E calculated a noncompliant girt frame deflection and sheets E1, E3 and 8 depicted girt frames measuring 4' 2¾" by 27' 8" and arranged in a 9' 7" elevation with rectangular 8" by 8½" members due to the added fail safe, sheave and chain drives and gear motors (R4 folder 4, tab F at 4-5; tr. 315-16).

DECISION

The dual sheaves and cables Carco added to VLDs 101B and 102C (finding 25(e)) required added sheave and chain drives, gear motors and devices for both VLDs 101B and 102C (findings 26(d), 27(d)). NASA insisted that Carco add chain and sprocket drives at the main sheave assemblies located in the headers of VLDs 101B and 102C (finding 51, *infra*). Such additional components increased the sizes of the mechanical enclosure frames for VLD 101B from 27' 3" to 40' 8" in length and elevation from 14' 6" to 19' 6", and the frame lengths for VLD 102C from 25' to 27' 8" (findings 26(e), 27(e)).

Specification § 08365, ¶ 2.1.2, required the frames not to be "out of line by more than ? -inch in 20 feet" (finding 2). VLD submittal No. 36E, prepared after the aforesaid sheave and chain drives, gear motors and devices were added to the VLDs, calculated a VLD 101B girt frame deflection of 1.47" in 39' 11" (finding 26(e)) and a girt frame deflection for VLD 102C (finding 27(e)), neither of which complied with the foregoing door frame alignment requirement. We hold that the added mechanical devices were the first and preponderant cause of the increased sizes and rectangular members of the VLD frames so as to increase their stiffness and bring them into compliance with the frame deflection requirement, and, therefore, the changed rectangular members were constructive changes.

FURTHER FINDINGS OF FACT ON CLAIM ITEM 9

28. (a) Carco alleged that NASA refused to approve Carco's VLD drawings if they were not re-drawn to scale, "even if all dimensions were designated and cross checked" (R4, tab 31). (b) The first six VLD submittals set forth few dimensions some of which were inconsistent, and few sheets were scaled. In submittal No. 36A, sheet E-6, a 3' weather hood dimension measures ? " long (1" = 3.43'), while its 29' dimension measures 9? " long (1" = 3'), and in submittal No. 36D, only two sheets were scaled, of which, sheet 22, labeled "SCALE FULL," stated dimensions that, as measured, varied from "full" scale (R4, folder 4, tabs A-F). (c) Carco's president testified that NASA directed that all VLD drawings must be to scale (tr. 320), but the record does not substantiate such statement (R4, folder 4). (d) We find that Carco provided some scaled drawing sheets and corrected erroneous and inconsistent dimensions to permit the evaluation of its proposed VLD design (tr. 176).

DECISION

Appellant did not prove its allegation that NASA required it to scale all its VLD drawings (finding 28(c)). Appellant revised and scaled drawings with various erroneous and inconsistent dimensions (finding 28(d)). No constructive change was proven.

FURTHER FINDINGS OF FACT ON CLAIM ITEM 10

29. (a) Carco alleged that NASA's reviews of Carco's VLD submittals were "excessive and inordinate" because they were derived from the comments of Carco's competitor, repeated previous comments that Carco allegedly had "addressed and corrected" and added numerous requirements not stated in the contract specification and drawing (R4, tab 31). (b) The record contains no evidence that EPDC "bid" or competed with Carco for the VLD subcontract prior to 16 June 1992 (tr. 58, 702). (c) In October and December 1992, and in June 1996, at NASA's request, EPDC reviewed VLD submittal Nos. 36A, 36B, 36C and 36G (R4, tab 77, ex. 3 at 12-20). (d) Regarding DRC's eight VLD shop drawing submittals, totaling 266 shop drawing sheets, cumulatively: (i) Submittal No. 36 referred to other sheets not submitted, and was plainly incomplete (R4, folder 4, tab A). (ii) Submittal No. 36A lacked VLD and component load calculations (findings 26(c), 27(c), 37(d)), and showed a sheave mount not conforming to specification § 08365, ¶ 2.1.6.2 (findings 2, 45(b)), inconsistent dimensions (finding 28(b)), and the dust shield mis-attached (finding 43(b)). (iii) Submittal No. 36B lacked load calculations and showed the non-conforming sheave mount (finding 45(c)), nonconforming V-groove roller cams, mis-attached dust shield, and inconsistent dimensions (R4, folder 4, tab C at 3, sheets 1, 3, E2, E6, E17). (iv) Submittal No. 36C lacked load calculations and repeated the inconsistent dimensions (R4, folder 4, tab D at 3, sheet E6). (v) Submittal No. 36D lacked load calculations, repeated the inconsistent dimensions (R4, folder 4, tab E, sheet E6), included dimensions conflicting with the stated drawing scale (finding 28(b)), and showed cable holes smaller than cables (finding 43(d)). (vi) Submittal No. 36E calculated a door frame deflection of 1.47" in 39' 11", not conforming to specification § 08365, ¶ 2.1.2, and repeated inconsistent dimensions and dimensions conflicting with the drawing scale (R4, folder 4, tab F at 3, sheets E6, 22). (vii) Submittal No. 36F repeated the non-conforming frame deflection and dimensions conflicting with the stated scale (R4, folder 4, tab G at 3, sheet 22). (e) We find that NASA's iterative reviews of the VLD submittals were neither excessive nor inordinate, but were the consequences of DRC's piecemeal submissions and the foregoing deficiencies (R4, folder 4, tabs A-G). Our findings and decision on other claim items show the extent to which VLD submittal reviews added design features.

DECISION

VLD submittal Nos. 36 through 36F contained omissions, errors and nonconformities, some of which were repeated in later submittals (finding 29(d)). NASA's

iterative submittal reviews were not excessive or inordinate, but resulted from appellant's piecemeal submissions and deficiencies (finding 29(e)). No compensable constructive change was proven.

FURTHER FINDINGS OF FACT ON CLAIM ITEMS 11 AND 12

30. (a) Carco alleged that the "specifications clearly indicate the responsibility of the door manufacturer and what is provided and installed by others," namely, electrical (item 11) and mechanical (item 12) sources, but NASA required Carco to provide electrical and mechanical "tie-in" and "hookup" work (R4, tab 31). (b) DRC's 20 September 1993 letter to NASA stated that DRC's mechanical and electrical subcontractors interpreted their work scopes to require only Divisions 15 and 16 work, respectively, and Carco interpreted specification § 08365, ¶¶ 2.1.6.3 and 2.1.10, to require pneumatic lines and electrical installation and wiring by the Divisions 15 and 16 subcontractors, respectively (R4, tab 65; tr. 390-91). (c) The CO's 27 September 1993 letter to DRC stated that DRC had the duty to coordinate the specified work, including installation of field wiring and mounting of all electrical and pneumatic controls (R4, tab 67). (d) DRC's 29 September 1993 letter to Carco advised that NASA would not "issue a change order for supplying, installing, and wiring necessary components which are your responsibility" and the phrase "by Division 16" in ¶ 2.1.10 meant "in conformity with Division 16 regulations, but the responsibility would remain on the door manufacturer to perform them" (R4, tab 70). (e) Representatives of DRC, Carco, and Consolidated Electric (the Division 16 subcontractor) met on 8 October 1993 (R4, tab 70A). According to Carco, COTR Don Minderman directed Carco to perform the electrical and mechanical connections in issue (tr. 389, 393-98). Mr. Minderman denied that he told DRC that Carco was supposed to do Division 15 and 16 work on the VLDs (tr. 596). We find that DRC, not NASA, directed Carco to perform the foregoing electrical and mechanical connections (tr. 131-32).

DECISION

Specification § 08365, ¶ 3.1, required operational VLDs (finding 2). NASA did not direct Carco to install field wiring and mounting to "tie-in" and "hook-up" all VLD pneumatic and electrical controls, but rather DRC did so (finding 30(c)). Which of DRC's subcontractors was required to perform such "tie-in" and "hook-up" work to make the VLDs operational is immaterial. *See David Boland, Inc.*, ASBCA Nos. 51259, 51359, 01-2 BCA ¶ 31,423 at 155,170 (prime contractor, not government, is responsible to determine how work is divided among subcontractors); *R. A. Burch Construction Co.*, ASBCA No. 39017, 90-1 BCA ¶ 22,599 at 113,395-96 (same). No constructive changes were proven.

FURTHER FINDINGS OF FACT ON CLAIM ITEM 13

31. (a) Carco alleged that due to delay in electrical and mechanical services to operate the VLDs after their installation, NASA directed Carco for months to open and

close the VLDs daily by hand cranking (R4, tab 31). (b) The FAR 52.236-7 PERMITS AND RESPONSIBILITIES (NOV 1991) clause incorporated by reference in contract 11924 made DRC responsible for all materials delivered and work performed until completion and acceptance of the entire work (R4, tab 1 at 75). (c) The KSC 52.236-106 INTERFERENCES AND COORDINATION OF WORK clause required DRC to coordinate construction work scheduling to avoid interferences between trades and installations, including connection of electrical service (finding 10(a); tr. 626). (d) NASA directed DRC, and DRC directed Carco, to raise and lower VLDs by the hand crank each day until permanent electrical and mechanical power was installed (tr. 323-24) to allow entrance to the facility and to protect installed materials from damage by weather (tr. 625-26).

DECISION

The FAR 52.236-7 PERMITS AND RESPONSIBILITIES (NOV 1991) clause in contract 11924 made DRC "responsible for all materials delivered and work performed until completion and acceptance of the entire work . . . ." (finding 31(b)). Contract 11924 required DRC to coordinate work scheduling to avoid interferences between trades and their installations, including connection of electrical service (findings 10(a), 31(c)). NASA directed DRC, and DRC directed Carco, to raise and lower VLDs by the hand crank each day until permanent electrical and mechanical power was installed to allow entrance to the facility and to protect installed materials from the weather (finding 31(d)). Therefore, opening and lowering the VLDs daily by hand cranking before electrical service was initiated, in order to protect interior materials from weather damage, was DRC's responsibility, which it directed Carco to discharge, and was not a constructive change. *See David Boland*, ASBCA Nos. 51259, 51359, 01-2 BCA ¶ 31,423 at 155,170; *R. A. Burch Construction Co.*, ASBCA No. 39017, 90-1 BCA ¶ 22,599 at 113,395-96.

FURTHER FINDINGS OF FACT ON CLAIM ITEM 14

32. (a) Carco alleged that the specifications require painting only the "exposed surfaces" of VLD towers and, after successful Defense Contract Administration Services (DCAS) and contractor inspections at Carco's shop, when the towers arrived on site, NASA's inspector required Carco to paint their interior surfaces, necessitating the return of the towers to the shop for blasting and painting (R4, tab 31). (b) At its shop Carco applied inorganic zinc primer to the exposed exterior surfaces and structural members (beams, columns and angle braces) of the VLD towers, but not to their interior sheet plating. DCAS performed source inspection and approved the towers. (Tr. 325-28) (c) When Carco delivered the towers to the job site on 23 July 1993, NASA refused to permit Carco to unload them because all their interior surfaces were not primed (R4, tab 5, daily log #290). Carco brought the towers back to its shop, and blasted and painted all their interior surfaces (tr. 327-28).

DECISION

Specification § 08365, ¶ 2.1.7, Shop Painting, required all structural steel surfaces to be painted with one coat of Zinc Rich compound primer and cross-referenced § 09901 for field painting of exposed surfaces (finding 2). Specification § 09901, ¶ 3.5, required interior metals to be painted with primer but its enumeration of surfaces to be primed and painted did not include the interior, non-exposed surfaces of the counterweight towers or analogous structures (finding 3). NASA rejected the VLD towers for lack of primer on their interior surfaces, which Carco thereupon primed (finding 32(c)). Primer painting of the interior, non-exposed metal surfaces of the counterweight towers was not required by the specification and hence constituted a constructive change.

FURTHER FINDINGS OF FACT ON CLAIM ITEM 15

33. (a) Carco alleged that the framing subcontractor refused to make the "tie-in" of sheet metal to the building's siding for both VLDs, and NASA directed Carco to perform such work, though the specifications did not require the VLD manufacturer to do such "tie-in" work (R4, tab 31). (b) There were several gaps between the framing Carco installed for the VLD weatherhoods, and the brake metal, trim and siding installed by the wall manufacturer (tr. 329-31). (c) On 16 September 1993, DRC instructed Carco "to provide all weather hood structural frame work . . ." citing specification § 08365, ¶ 2.1.5 (R4, tab 62). We find that NASA did not instruct or direct Carco to add such framing. (d) Carco filled the weatherhood framing gaps over VLDs 101B and 102C with additional framing (tr. 331-32).

DECISION

NASA's drawing depicted the VLD weatherhood enclosure abutting the brake metal hood of VLD 101B (findings 6, 8(b)) and abutting the roof deck of VLD 102C (finding 9(a)). DRC, not NASA, directed Carco to provide structural frame work to fill gaps between the weatherhood framing and brake metal, trim and siding (finding 33(b), (c)). Therefore, no constructive change was proven.

FURTHER FINDINGS OF FACT ON CLAIM ITEM 16

34. (a) Carco alleged that NASA directed Carco to change all stainless steel sheave assembly grease fittings to a 90° type for easier access, to replace all stainless steel shim plates with "finger shims," to provide stainless steel set screws for the sheaves, and to increase the size of, and to add Teflon liners to, the mounting plate's cable holes, thus requiring Carco to return the assemblies to its shop for disassembly, rework and re-assembly (R4, tab 31). (b) According to Carco, when its VLD sheave assemblies arrived at the job site, a NASA site inspector identified as "Raul" or "Richard" refused to allow Carco to unload them and gave Carco a list of items "that had to be corrected" on the sheaves, including inaccessible grease fittings, adding shim washers, enlarging cable holes and

adding teflon liners (tr. 334-36, 348-52). (c) NASA's 28 October 1993 daily log noted the arrival of the sheave assemblies and stated that their grease fitting was not accessible and needed shim washers to properly align the sheave to the roller bearing, did not mention cable holes or teflon liners, and stated that the "sheave assemblies . . . were removed from the job site at the direction of Carco Supt. R. Santos" (R4, tab 5, daily log #380). (d) The grease fitting, shim washers, cable hole sizes and teflon liners were not required by specification § 08365, ¶ 2.1.6.2, or by the drawing, nor were they shown on Carco's approved VLD shop drawings (R4, tab 1; folder 1, tabs G-H; tr. 353). (e) Carco modified the grease fittings and cable holes, and added shims and teflon liners (tr. 334-36, 348-52, 478-80). We find that Carco did not volunteer such work.

DECISION

Item 16. Neither specification § 08365, ¶ 2.1.6.2, nor appellant's approved VLD shop drawings specified or depicted 90º type grease fittings, shim washers, cable hole sizes and teflon liners for the sheave assemblies (finding 34(d)). NASA rejected appellant's sheave assemblies unless Carco modified the cable holes and added 90º type grease fittings, shim washers and teflon liners (finding 34(b), (c), (e)). Carco did not volunteer such work (finding 34(e)). NASA's direction to modify the cable holes and to add 90º type grease fittings, shim washers and teflon liners was a constructive change.

FURTHER FINDINGS OF FACT ON CLAIM ITEM 17

35. (a) Carco alleged that after Carco's inflatable frame seal system around each door panel was almost completely installed, NASA told Carco to remove it because its aluminum seal retainer, inorganic zinc coating, and steel panels would corrode due to dissimilar metals, thereby requiring Carco to disassemble the VLDs, to place an electrical seal tape between those surfaces, to caulk each threaded hole in which stainless steel bolts were used, and to reinstall the doors (R4, tab 31). (b) When Carco had nearly completed inserting pneumatic seals into aluminum retainers attached to the steel VLD panels and adjusting angles which were "inorganic zinc painted," inspector Tyler told Carco that it was "mounting aluminum to ferrous metal" (tr. 337-39). (c) Based on the recommendations of EPDC and of an unidentified NASA "corrosion expert" that zinc was not considered a "viable electric barrier," NASA required Carco to provide electrical tape between aluminum and ferrous surfaces (tr. 345, 790-91, 793-94). The record contains no evidence whether "inorganic zinc paint" is "bituminous paint." (d) Carco installed that electrical tape on 22 October 1993 (R4, tab 5, daily log #375).

DECISION

Specification § 09901, ¶ 3.5, provided: "Separation of dissimilar metals one coat of Bituminous paint" (finding 3). General Note 11 on NASA's drawing, sheet A-1, stated: "COAT DISSIMILAR METALS WITH (1) COAT OF BITUMINOUS PAINT OR OTHER

APPROVED MATERIAL" (finding 5). The record contains no evidence whether "inorganic zinc paint" is "bituminous paint" (finding 35(c)). NASA required appellant to add electrical tape between the aluminum pneumatic seal retainers and the steel VLD panels (finding 35(d)). Appellant did not carry its burden of proving that the "inorganic zinc paint" on its VLD panels and adjusting angles was "bituminous paint" as the specification required. Therefore, NASA's direction to add electrical tape was not a constructive change.

FURTHER FINDINGS OF FACT ON CLAIM ITEMS 18 AND 19

36. Item 18. (a) Carco alleged that it performed additional labor for additional work items required by NASA, for example, AC brackets and cutting access holes (R4, tab 31). (b) According to Carco, such labor was for all the alleged "change orders," *i.e.*, items 1-36 (tr. 346). We find that such labor is an element of damages, not liability.

37. Item 19. (a) Carco alleged that NASA required Carco to change its proposed "L" shaped door guide shown on the contract drawing to "T" shaped door guides so as to provide more stability (R4, tab 31). (b) Specification § 08365, ¶ 2.1.3, required a "rigid installation" of the door guides and ¶ 2.1.6.1 required "single angle steel door guides" (finding 2). (c) VLD submittal No. 36, drawing E3, Sections E and F, depicted "L" cross-sectional door guides conforming to the door guide configuration in the NASA drawing, sheet A-20, details 1 and 2 (R4, tab 1; folder 4, tab A; tr. 795). (d) NASA's review comments on submittal No. 36A stated: "Provide calculations on door guide angles" (R4, folder 4, tab B at 4). NASA expressed concern that Carco's proposed door guide was supported on only one side and could tend to tip or move (tr. 254-55). (e) Carco did not provide NASA a load calculation to substantiate the use of the "L" cross-section door guide (tr. 632, 795). (f) VLD submittal Nos. 36F and 36G changed the door guide to a "T" cross-section (R4, folder 4, tabs G, H, sheets 14, 21; tr. 258).

DECISION

Item 19. Specification § 08365, ¶ 2.1.3, requires a "rigid installation" of the VLD door guides and ¶ 2.1.6.1 required "single angle steel door guides" (finding 2). The NASA drawing, sheet A-20, depicted the door guides of an "L" cross-section configuration (findings 8(h), 9(g)). Appellant's first submittal depicted VLD door guides configured as in NASA's sheet A-20 (finding 37(c)). NASA requested "calculations on door guide angles," and expressed concern that appellant's door guide was supported only on one side and could tend to tip or move (finding 37(d)). Appellant did not provide calculations on the "L" shaped door guides and changed the guides to a "T" cross-section (findings 37(e), (f)). We hold that NASA's inducing of Carco to change the door guide configuration from a single angle, "L" cross-section, to a double angle, "T" cross-section, was a constructive change.

FURTHER FINDINGS OF FACT ON CLAIM ITEM 20

38. (a) Carco alleged that NASA rejected Carco's proposed design of angle bracket with stiffeners to support the inflatable air seal frame, and required instead "a totally sealed channel to prevent dust collection and any warpage that could occur," which change made the rear of the support frame inaccessible for attachment devices and required substantial drilling and tapping (R4, tab 31). (b) Contract specification § 08365, ¶ 2.1.6.3, and drawing sheet A-20 did not prescribe the configuration of the VLD seal's "adjusting angle" (R4, tab 1). (c) VLD submittal No. 36A, sheet E5, Sections A and B, depicted the air seal retainer bolted to a "C" cross-section channel whose two parallel legs abutted the VLD (R4, folder 4, tab B). (d) VLD submittal No. 36B, sheet E5, Sections A and B, depicted the air seal retainer bolted to an "L" section bracket one of whose legs was braced with stiffeners and welded to the VLD (R4, folder 4, tab C; tr. 264). NASA's 22 December 1992 arrow note on sheet E5 pointed to the spaces behind the "L" section brackets and stated: "these open spaces will collect dirt & drop into Bldg." (R4, folder 4, tab C). (e) VLD submittal Nos. 36D and 36G, sheet E-5, which NASA eventually approved, depicted the air seal retainer bolted to a "C" cross-sectioned channel with its two parallel legs abutting the VLD, as in Carco's first design (R4, folder 4, tabs E, H; tr. 266). (f) We find that NASA's comments on VLD submittal No. 36B were reasonable and consistent with the specification § 08365, ¶ 2.1.6.3, requirement for the door pocket to be sealed from dust (finding 2).

DECISION

Specification § 08365, ¶ 2.1.6.3, required a dust shield atop "the top door leaf to seal door pocket" (finding 2). Submittal No. 36A depicted the air seal angle bracket as a "C" sectioned channel whose two legs abutted the VLD (finding 38(c)). Submittal No. 36B changed the angle bracket to an "L" section with a leg braced with stiffeners and welded to the VLD, to which NASA commented: "these open spaces will collect dirt & drop into Bldg" (finding 38(d)). Appellant's submittal Nos. 36D and 36G reverted to its original "C" section angle bracket (finding 38(e)). NASA's comments on VLD submittal No. 36B were consistent with the specification § 08365, ¶ 2.1.6.3, requirement for the door pocket to be sealed from dust (finding 38(f)). The approved adjusting angle or bracket configuration was not a change.

FURTHER FINDINGS OF FACT ON CLAIM ITEM 21

39. (a) Carco alleged that NASA required Carco to increase the size of, to reposition, to add supporting hinges to, and to seal with neoprene weather stripping, the mechanical access panels on the four towers for VLDs 101B and 102C, which work was beyond the scope of the contract specifications (R4, tab 31). (b) The contract drawing did not depict the location or configuration of the VLD counterweight towers' mechanical access ports (R4, tab 1; tr. 275). (c) NASA's arrow note, "Provide latching pin hinges," pointed to the bolted mechanical access port of the counterweight towers on VLD 101B on sheet E-1 of VLD submittal No. 36E (R4, folder 4, tab F; R4, tab 79 at 82). (d) On 30 December 1993 Carco installed "hinged motor access doors" on the counterweight

towers for both VLDs (R4, tab 5, daily log # 427). Carco's president testified, and we find, that "through other submittal processes, these doors ended up having a piano hinge, because [NASA] didn't want to pick these ports off and set them down" (tr. 277; R4, tab 79 at 91). (e) "One-man" easy access panel covers required by specification § 08365, ¶ 2.1.6.2, pertain to the sheave access panel covers, which are not the subject of this claim. The counterweight tower access ports are under the general requirement of § 08365, ¶ 2.1, to "provide access ports of adequate working room size to access all maintainable components," which has no "one-man" requirement. (Finding 2)

DECISION

NASA's drawing did not depict the location or configuration of the counterweight tower mechanical access ports (finding 39(b)). Appellant's submittal No. 36E depicted a bolted mechanical access port on the counterweight towers of VLD 101B, to which NASA's arrow note said: "Provide latching pin hinges" (finding 39(c)). Carco installed "hinged motor access doors" (finding 39(d)). NASA argues that specification § 08365, ¶ 2.1.6.2 required "easy access [to VLD panel sheaves] by 'one man' removable covers" (finding 2). But that requirement is not pertinent to this claim (finding 39(e)). Such hinged access doors for the counterweight tower ports were a constructive change.

FURTHER FINDINGS OF FACT ON CLAIM ITEM 22

40. (a) Carco alleged that a NASA field inspector required Carco to weld the sheave assemblies onto the VLD headers, which assemblies Carco had attached previously with bolts (R4, tab 31). (b) The contract specification and drawing sheet A-20 did not prescribe the method of affixing the sheave assemblies to the VLD headers (R4, tab 1; tr. 333). (c) VLD submittal No. 36F, sheet E-13, depicted bolts for attaching the sheave assemblies atop VLD 101B, and submittal No. 36G, sheet E-11, depicted bolts for attaching the sheave assemblies atop VLD 102C (R4, folder 4, tabs G-H). (d) Carco bolted sheave assemblies onto the VLDs on 1-3 November 1993 (R4, tab 5, daily log #s 382-84). (e) According to the uncorroborated, hearsay testimony of Carco's president, a NASA inspector identified as "Raul" or "Richard" asked what happened if the bolts came loose, pressed Carco to remove the bolts and to weld the center sheave assemblies. Carco removed the bolts, welded the sheave assemblies, re-blasted and repainted the door panels. (Tr. 334-36, 484-85). We accord no probative weight to such testimony.

DECISION

Contract 11924's specification and drawing did not prescribe the method of affixing the sheave assemblies to the VLD headers (finding 40(b)). The approved VLD submittals depicted bolts for attaching such sheave assemblies, and appellant bolted such assemblies onto the VLDs (finding 40(c), (d)). We accord no probative weight to appellant's uncorroborated, hearsay testimony that a NASA inspector identified as "Raul" or "Richard"

asked what happened if the bolts came loose, and pressed Carco to weld rather than to bolt the center sheave assemblies, which Carco says it did (finding 40(e)). Appellant did not prove a constructive change.

FURTHER FINDINGS OF FACT ON CLAIM ITEMS 23 AND 24

41. Item 23. (a) Carco alleged that NASA required Carco to remove the warning bells and to install buzzers on the VLD to warn personnel of its movement (R4, tab 31). (b) On 4 May 1994 NASA and DRC signed bilateral Modification No. SA-72, including Change Order No. TB-176/CO-66, issued on 14 January 1994, "Change Vertical Lift Door Signaling Device from Bells to Horns," for a $3,646 equitable adjustment, and an unqualified DRC release citing accord and satisfaction (R4, tab 1). (c) Carco withdrew item 23 at the hearing (tr. 358).

42. Item 24. (a) Carco alleged that after Carco's VLD drawing submittal stated "Seal Master or equal" for the inflatable VLD seals, NASA required Carco to state "Seal Master" "ONLY and NOBODY ELSE," making the component sole source (R4, tab 31). (b) VLD submittal Nos. 36A and 36B, sheet E5, sections A and B, depicted a "Seal Master No. G12 or equal" seal and included Seal Master product literature showing the dimensions of its G12 seal (R4, folder 4, tabs B-C). (c) In December 1992 NASA's arrow note on sheet E5 encircled "or equal" and said: "Typical: There is 'no equal.' It is either Seal Master or it isn't" (R4, folder 4, tab C). (d) VLD submittal No. 36C, sheet E5, deleted "or equal" from the Seal Master seal (R4, folder 4, tab D). (e) The record contains no evidence that Carco or DRC identified to NASA by product name any inflatable seal "equal" to, and priced less than, the Seal Master G12 seal (tr. 272).

DECISION

Submittal Nos. 36A and 36B described the VLD inflatable air seal as "Seal Master No. G12 or equal" (finding 42(b)). After NASA's arrow note circled "or equal" and stated: "There is 'no equal.' It is either Seal Master or it isn't," appellant deleted the phrase "or equal" from that description (finding 42(c), (d)). The record contains no evidence that appellant identified to NASA any inflatable seal "equal" to, and priced less than, the Seal Master G12 seal (finding 42(e)). Appellant did not prove a constructive change.

FURTHER FINDINGS OF FACT ON CLAIM ITEM 25

43. (a) Carco alleged that NASA directed Carco to add Teflon hole liners and cable guides to the design of the dust shield atop the VLDs (R4, tab 31). (b) VLD submittal Nos. 36, 36A and 36B, sheets E2 and E3, section B, depicted dust shields for VLDs 101B and 102C without any cable holes. On submittal No. 36A NASA asked about the dust shield, "How does this work? Provide additional details" (R4, folder 4, tabs A-C). (c) VLD submittal No. 36C, sheet E2, showed three rows of three, ? " holes spaced in the center of

the dust shield, and sheets E-11 and E-13 showed ? " cable for VLD 102C and ½" cable for VLD 101B (R4, folder 4, tab D). (d) On VLD submittal No. 36D, sheets E-11 and E-13, showed 7/16" cables for both VLDs. On sheet E2, NASA's arrow note pointed to the smaller ? " dust shield cable hole diameters and stated: "holes and alignment have to be right on to avoid cable rubbing suggest larger ? holes – coord w/ 7/16" ? cable." (R4, folder 4, tab E) (e) VLD submittal No. 36E, sheets E2, E-11, E-13 and E-22 depicted 7/16" cables and 1" dust shield cable hole diameters for both VLDs. NASA crossed off those cable hole diameters and stated 1½" (R4, folder 4, tab F; tab 79 at 84). (f) VLD submittal No. 36F, sheet E-22, and No. 36G, sheets E-2 and E-6, for VLDs 102C and 101B showed 1½" dust shield cable holes, without sleeves. NASA noted on sheet E-6: "sleeves w/flared ends per mtg." (R4, folder 4, tabs G-H; tab 79 at 91). Carco placed teflon liners on the dust shields' cable holes (tr. 359).

DECISION

Submittal No. 36A showed a single pick VLD design (finding 21(c)). Submittal No. 36D depicted ? " dust shield center cable holes for 7/16" cables, to which NASA said, "holes and alignment have to be right on to avoid cable rubbing suggest larger ? holes – coord w/ 7/16" ? cable" (finding 43(d)). Submittal No. 36E increased the dust shield cable hole size to 1", which NASA crossed off and stated 1½"; such 1½" diameter appeared in submittal Nos. 36F and 36G, on which NASA noted "sleeves w/flared ends per mtg."; appellant installed teflon liners on the dust shield cable holes (findings 43(e), (f)). Such enlarged dust shield cable hole diameters and teflon liners were reasonably needed to avoid cable damage, and were the consequences of appellant's single pick VLD design, which required cable penetrations in the center of the dust shield, and its depiction of cable sizes inconsistent with cable hole sizes. Therefore, such configuration revisions were not the responsibility of NASA and were not constructive changes.

FURTHER FINDINGS OF FACT ON CLAIM ITEM 26

44. (a) Carco alleged that NASA directed Carco to relocate the mounts, and to modify connecting hardware, for the VLDs' sheave drive motors from the proposed concrete slab location, to the steel frames of the VLD towers (R4, tab 31). (b) The contract specification did not state, and the drawing did not show, on what surface the sheave drive motors were to be mounted (R4, tab 1; tr. 361-62). (c) VLD submittal No. 36A, sheets E6 and E7, depicted drive motors mounted on metal and concrete footings on the floor at the base of the drive enclosure. NASA's notes on sheet E6 stated: "Anchor for motor and gear boxes should not require footings and pads. Unit should be mounted on steel frame attached to door tower" (R4, folder 4, tab B; tr. 364-65). NASA's lead design engineer, James O'Malley, testified that Carco was free to disregard such comments. Considering that NASA's VLD submittal review spanned over nine months, it disapproved the first five submittals, partly approved the sixth and seventh submittals, and approved the eighth submittal, we find that Carco was not free to disregard such comments. (d) VLD

submittal No. 36B, sheets E6, E7, E14 and E15, and later re-submittals, depicted drive motors mounted on platforms 18½" above the floor within the mechanical drive enclosures (R4, folder 4, tabs C-H).

DECISION

The contract specification did not state, and the drawing did not show, on what surface the sheave drive motors were to be mounted (finding 44(b). Submittal No. 36A showed such motors mounted on metal and concrete footings on the facility floor. NASA declined to approve appellant's submittals until it relocated the motor mount to platforms attached to the VLD towers 18" above the floor. Under the circumstances of NASA's lengthy submittal reviews and repeated disapprovals, appellant was not free to disregard NASA's comments. (Finding 44(c)) NASA's direction to relocate the drive motor mounts to platforms within the mechanical drive enclosures 18½" above the facility floor (finding 44(d)), was a constructive change.

FURTHER FINDINGS OF FACT ON CLAIM ITEM 27

45. (a) Carco alleged that NASA directed Carco to relocate the sheave assemblies from above the VLD frames within the outside width dimensions, as Carco proposed, to locations internal to the panels (R4, tab 31). (b) VLD submittal No. 36A, sheets E6 and E7, depicted sheaves above the top center, and attached by plates extending 6" below the top, of each VLD panel. NASA commented: "The specifications require the sheaves located on the panels to be mounted on the inside of the panel behind removable access panels. The design . . . has all panel mounted sheaves on the exterior face of the door panels. The direct exposure of these items could contribute foreign material directly into the clean room atmosphere" and stated on the drawing: "Panel sheaves must be mounted inside door panels (not visible)" (R4, folder 4, tab B; tr. 366-67, 645-46). (c) VLD submittal No. 36B, sheets E6 and E7, continued the same sheave to panel attachment; NASA stated: "No! . . . must be concealed in door panel, w/access cover per spec." (R4, folder, tab C). (d) VLD submittal No. 36C, sheets E6 and E7, relocated the sheaves to within the panels (R4, folder 4, tab D).

DECISION

Specification § 08365, ¶ 2.1.6.2, stated that panel sheaves "shall be mounted on the interior of the panel" (finding 2). Submittal No. 36A depicted uncovered sheaves above the top center of each VLD panel (finding 45(b)), which did not comply with the foregoing specification requirement. Appellant's relocation of the sheaves to within the VLD panels (finding 45(d), complied with such requirement, and did not constitute a constructive change.

FURTHER FINDINGS OF FACT ON CLAIM ITEM 28

46. (a) Carco alleged that NASA's specified VLD header (weatherhood) dimensions were inadequate to provide proper clearance for the framing, sheaves and doors to fit within the header, requiring Carco to increase the VLD header's height (R4, tab 31). (b) VLD 101B's header height increased from 14' 6", as first depicted, to 19' 6", as approved (finding 26(b), (e)), due to the addition of dual sheaves and cables (claim item 6) and dual overhead gear boxes, chains and sprockets (claim items 33 and 34) (findings 26(d), 51(g)). (c) VLD 102C's header height *decreased* from 10', as first depicted, to 9 7", as approved (finding 27(b), (e)).

DECISION

VLD 101B's 5-foot increase in header height over the course of submittal reviews was due to the addition of dual sheaves and cables and dual overhead gear boxes, chains and sprockets in claim items 6, 33 and 34 (finding 46(b)), which items we have held were constructive changes. Therefore, VLD 101B's increased header height was a constructive change. However, VLD 102C's header *decreased* in height by five inches over the course of submittal reviews (finding 46(c)). No constructive change for the VLD 102C header was proven.

FURTHER FINDINGS OF FACT ON CLAIM ITEMS 29 AND 30

47. Carco withdrew item 29 at the hearing (tr. 371).

48. Item 30. (a) Carco alleged that NASA inspectors directed Carco, after DCAS had inspected and approved the VLD installation, to remove the thick neoprene pads to support the VLD panels in their closed position, and replace them with pads extending the full width of the VLD frame (R4, tab 31). (b) VLD submittal No. 36, sheets E2 and E3, detail 1, depicted the VLD bottom air seal abutting the facility's floor, as in detail 3 on contract drawing A-20 (R4, tab 1; folder 4, tab A). (c) On VLD submittal No. 36D, sheet E-2, detail 1, NASA encircled the door seal abutting the floor, and commented: "How is area between safety edge and door seal closed off?" (R4, folder 4, tab E). (d) On VLD submittal No. 36E, sheet E-5, NASA's arrow note pointed to the door/floor interface and said: "How is area between safety edge & door seal closed off. suggest using neoprene pad as shown on detail above" (R4, folder 4, tab F; tab 79 at 82). (e) Approved VLD submittal No 36G, sheets E-2 and E-3, detail 1, showed a "¾" thk neoprene pad @ ea. end of door seal on door pnl." beneath the panel's lowest member and surrounding the bottom air seal (R4, folder 4, tab H). (f) Carco installed VLD base pads on 13, 14 and 22 December 1993 and 4 January 1994 (R4, tab 5, daily log #s 415, 416, 422, 429). After Carco installed neoprene pads of about half the width of the VLD panels, unidentified NASA personnel told Carco that such pads were not acceptable, and Carco replaced them with neoprene pads on the full width of the VLD panel (tr. 373-74).

DECISION

Item 30. The NASA drawing depicted two sealing components at the bottom of the VLDs: a safety edge seal and a ? " neoprene weatherstripping with flat bar retainer, and did not show any neoprene pad to close off the area between those two components (findings 8(f), 9(e)). Submittal No. 36 depicted the two specified bottom door seal components (finding 48(b)). At NASA's direction, appellant added ¾" thick neoprene pads at each end of the doors, and later removed and replaced those with full length neoprene pads (finding 48(e), (f)). Addition of those neoprene pads was a constructive change.

FURTHER FINDINGS OF FACT ON CLAIM ITEM 31

49. (a) Carco alleged that NASA required Carco to change the VLD control design to install a "soft stop" for the VLD drives rather than the specified requirement for the VLDs to "stop instantly" (R4, tab 31). (b) NASA stipulated that the contract drawings did not call for a soft stop (tr. 692). (c) According to Carco's president, the original VLD design "had a hard-stop push button to stop the door" (tr. 244). VLD Submittal No. 36 had no electrical schematic (R4, folder 4, tab A). (d) VLD Submittal No. 36A, sheet E-8, "CONTROL SCHEMATIC," showed push button No. PB-1 STOP, but did not state whether it is for "hard" or "soft" stop, and had no electrical bill of materials with part numbers (R4, folder 4, tab B). (e) VLD submittal No. 36B, sheet E-8, "CONTROL SCHEMATIC," showed push button No. PB-S STOP, part No. A-B # 800H-FPX6D4. NASA commented: "Motor will not soft stop if wired as shown . . . Verify motor will slow stop when sensing edge is activated before reversing" (R4, folder 4, tab C). (f) In VLD submittal No. 36C, the 14 January 1993 memorandum of "James L. Gay, P.E., Consulting Engineer," commented on Carco's electrical drawings:

> 2. Note: "Motor will not soft stop if wired as shown."
>
> Comment:
>
> a. The "soft start" control specified does not have the "soft-stop" feature, as it was not intended.
>
> b. In view of recent changes in the mechanical drive, however, it is now deemed advisable to include the "soft-stop" feature (decelerating ramp). See revised drawing.

Sheet E-8's "POWER WIRING" schematic dated 14 January 1993 added a fourth push button, designated "emergency stop PB-ES," which emergency stop design NASA approved in submittal No. 36G. (R4, folder 4, tabs D, H)

DECISION

Specification § 08365, ¶ 2.1.6.7, required three pushbuttons, marked "OPEN," "CLOSE," and "STOP" (finding 2). The contract drawing did not call for a "soft stop" feature (finding 49(b)). NASA's comment on submittal No. 36B required appellant to verify that the VLDs would "soft stop" or "slow stop" (finding 49(e)). Carco's consulting engineer commented: "In view of recent changes in the mechanical drive, however, it is now deemed advisable to include the 'soft-stop' feature" (finding 49(f)). NASA was responsible for the "recent changes" in the mechanical drive (finding 51(b)-(g), *infra*). Submittal No. 36C added a fourth pushbutton, designated "emergency stop PB-ES" for the soft stop feature (finding 49(f)). Since NASA was responsible for the mechanical drive changes, Carco's addition of the soft stop feature was not volunteered, but was a consequence of such changes. We hold that addition of the soft stop feature was a constructive change.

FURTHER FINDINGS OF FACT ON CLAIM ITEMS 32, 33 AND 34

50. Item 32. Carco withdrew this item at the hearing (tr. 345).

51. Items 33 and 34. (a) Carco alleged that NASA required Carco to add chain and sprocket drives at the main sheave assemblies located at the headers of VLD 101B (item 33) and of 102C (item 34), thus creating a redundant main sheave drive system and fail-safe design not prescribed in the contract scope (R4, tab 31). (b) Carco's drive assembly design first appeared in VLD submittal No. 36B, sheets E-14 and E-15 for VLDs 102C and 101B. It depicted a gear box at the top and at the bottom of each drive enclosure with single strand chains reeved about sprockets attached to the overhead and lower gear boxes and door panels. A NASA arrow note pointing to the overhead gear box asked: "How do doors operate if the gear box fails?" and NASA commented: "The operator design shown used an additional gearbox mounted to the traction sheaves. If this gearbox fails there is no way to manually operate the door." (R4, folder 4, tab C at 4) (c) VLD submittal No. 36C, sheets E-14 and E-15, added "Note #1" stating:

> In the event of the main drive gear box encountering a problem situation the gear box drive shaft shall be uncoupled from the sheave ass'y by removing the coupler. The door are [sic] held in position by the counter weight and can be operated by the failsafe arrangement (see-E20 [or E21]) (only in emergencies.) to a position that the gear box can be reactivated.

(Underlining in original.) NASA encircled Note #1 and said: "unacceptable." (R4, folder 4, tab D) (d) The 22 January 1993 note from NASA's architect-engineer to Carco stated:

> Need further explanation for Note #1, dwgs. E14 and E15. How does the fail safe mechanism work when over riding (by-passing) failed gear box. I do not feel comfortable with having

> to climb 45' ± to disengage drive shaft at gear box. Is there another way this can be accomplished?

(R4, tab 43) (e) In VLD submittal No. 36D, sheets E-14 and E-15, Note #1 remained and NASA commented: "Does overhead gear box need to be disconnected to run fail safe? No explanation on operation if cable broke on one door." (R4, folder 4, tab E) (f) VLD submittal No. 36E, sheet E-14, added "Note #2" stating: "The overhead gear box must work together with the fail safe mechanism for proper operation. (See fail safe operation.)" NASA commented on Note #2: "Careo [sic] to review and revise . . . clarify & coord with fail safe statement in data book. Need to review and discuss all scenarios" (R4, folder 4, tab F) (g) VLD submittal No. 26F, sheets E-14 and E-15, added a second overhead gear box, chains and sprockets interconnected with the first drive assembly components, and deleted Note #1 and Note #2 appearing in prior revisions of those sheets (R4, folder 4, tab G).

DECISION

Items 33 and 34. Specification § 08365, ¶ 2.1.6.5, required "immediate emergency manual operation of door in the event of electrical failure," but did not require a "fail safe" operational capability in the event of a mechanical failure, such as an overhead gear box failure (finding 2). NASA's rejection of appellant's overhead gear box uncoupling design and insistence upon such mechanical fail safe operational capability, required the addition of dual overhead gear boxes, chains and sprockets (finding 51(e)-(g)). Such additional components were a constructive change.

FURTHER FINDINGS OF FACT ON CLAIM ITEMS 35 AND 36

52. Item 35. (a) Carco alleged that NASA directed Carco to fabricate, install, and tie-in all complete hose reels and assemblies for the air feeds to inflate the VLD seals, though such work "was clearly specified by others (mechanical specs)" (R4, tab 31). (b) Carco interpreted specification § 08365, ¶ 2.1.6.4, to require the VLD manufacturer to design the "door control," meaning such items as seal hoses and hose reels needed to inflate the door seals, and to provide those items to the mechanical and electrical subcontractors for installation (tr. 386-87). (c) DRC's 20 September 1993 letter to NASA stated that DRC's mechanical and electrical subcontractors interpreted their work scopes to require only Divisions 15 and 16 work, respectively, and Carco interpreted specification § 08365, ¶¶ 2.1.6.3 and 2.1.10, to require pneumatic lines and electrical installation and wiring by the Divisions 15 and 16 subcontractors, respectively (R4, tab 65; tr. 390-91). (d) The CO's 27 September 1993 letter to DRC stated that DRC had the duty to coordinate the specified work, including installation of field wiring and mounting of all pneumatic controls (R4, tab 67). (e) Carco fabricated framing to mount, and hired and paid "other people" to install and hook up, the pneumatic controls (tr. 387).

53. Item 36. (a) Carco alleged that it incurred engineering costs and claim expenses "necessary to assemble and submit these claims" (R4, tab 31). We find that such costs are elements of damages (quantum), not liability.

DECISION ON ITEM 35

NASA did not direct Carco to mount and install the VLD pneumatic seal hoses and hose reels (finding 52(c), (d)). Which DRC subcontractor was required to mount and install such components is immaterial. *See Boland, Burch, supra*. Therefore, mounting and installing the seal hoses and hose reels was DRC's duty, not a constructive change.

ADDITIONAL FINDINGS OF FACT ON DELAY

54. Carco's 28 July 1998 claim letter alleged two delay periods: (a) first, NASA's delay in VLD shop drawing approvals arose "from all the design changes" (*i.e.*, claims 1-36) and resulted in a "148" (sic, actually 147) calendar day delay from 25 June 1993, when Carco planned to complete VLD work, to 19 November 1993, calculated by insertion of NASA approval delay days into its "As-Impacted" Schedule, and (b) second, "because NASA's subcontractor did not have the source of air completed," Carco was delayed from 3 December 1993 until 9 August 1994, a 249 calendar day period, before it could perform final VLD testing. Carco identified 15 days for check and operational testing and 15 days for punch list work omitted from its as-planned schedule, and concluded that 218 calendar days were government-responsible (R4, tab 31 at 12-13). Carco has not introduced evidence of NASA's liability for delays by the unidentified subcontractor in the second delay period.

55. Carco's claim included several "as-planned" bar charts with data date 20 May 1992 and "as-built" bar charts with data date 30 August 1994, each accompanied by a list of 20 major subcontract activities. Carco alleges that it "inserted the delay in the NASA shop drawing approval process" into the "as-built" bar charts, and provided these charts and lists to DRC at an unidentified date. Carco's activity bars were not exclusively sequential; some overlapped in time. The foregoing information was not a critical path analysis demonstrating how the impacting actions delayed subcontract performance as a whole. (R4, tab 31 at 12-13, appendices 19-23) Appellant's witnesses did not testify about or explain any of its foregoing delay data.

56. Carco's allegations and the foregoing data assumed that all VLD drawing approval delays were NASA-caused, did not identify the discrete number of delay days attributable to each alleged NASA design change, assumed that an unidentified NASA subcontractor responsible for the "source of air" to test the VLDs delayed Carco from 3 December 1993 to 9 August 1994, and ignored the 13 May 1994 termination of contract 11924 for default (finding 17).

DECISION

Our foregoing decisions on the 31 Carco claims show that Carco was responsible, in whole or in part, for 19, and NASA was responsible in whole or in part for 13, of those items. With no critical path analysis or explanation of Carco's delay data, and without identification of the discrete number of delay days attributable to each proven NASA design change, one cannot determine what portions of the 148-day or 218-day delay periods were government-responsible. Both delay periods suffer from the unacceptable total time approach used to calculate them. *See Bruno Law v. United States*, 195 Ct. Cl. 370, 382-83 (1971). Carco has not introduced evidence of NASA's liability for delays by DRC's unidentified subcontractor in the second delay period. Carco's allegation describing such subcontractor as "NASA's subcontractor" does not constitute proof, and any delay after 13 May 1994 when contract 11924 was terminated is not redressable under contract 11924.

CONCLUSION

We sustain the appeal with respect to appellant's claim items 6, 7, 8, 14, 16, 19, 21, 26, 28 (VLD 101B only), 30, 31, 33 and 34. We deny the balance of the appeal, except for claim items 18 and 36, which address damages, not entitlement, and which we do not decide. We remand the appeal to the parties to resolve quantum.

Dated: 7 April 2004

DAVID W. JAMES, JR.
Administrative Judge
Armed Services Board
of Contract Appeals

I concur

ALEXANDER YOUNGER
Administrative Judge
Armed Services Board
of Contract Appeals

I concur

MARK N. STEMPLER
Administrative Judge
Acting Chairman
Armed Services Board
of Contract Appeals

I concur

EUNICE W. THOMAS
Administrative Judge
Vice Chairman
Armed Services Board
of Contract Appeals

I certify that the foregoing is a true copy of the Opinion and Decision of the Armed Services Board of Contract Appeals in ASBCA No. 52160, Appeal of Dan Rice Construction Co., rendered in conformance with the Board's Charter.

Dated:

DAVID V. HOUPE
Acting Recorder, Armed Services
Board of Contract Appeals