MODCORR / MSP SAMPLE LIST OF TESTING ON FURNITURE, FIXTURES, AND EQUIPMENT. (ASTM, NFPA, UL, etc.)	
SECURITY GLAZING	
ASTM F-1915 Grade 4 (10 min)	Cell door glazing
ASTM F-1233 Class 3.2 (40 min, body passage)	Interior window glazing
ASTM F-1915 Grade 1 (60 min)	Control room glazing
ASTM F-1233 Class 3.2 (40 min, body passage)	Dayroom End Window Glazing
ASTM F-1915 Grade 1 (60 min)	Exterior Cell Window Glazing
DETENTION HOLLOW METAL	
ASTM F-1450-12a & F-1592-12	Frame
ASTM F-1450-12a & F-1592-12	Frame
ASTM F-1450-12a & F-1592-12	Frame
ASTM F-1450-12a	Door
ASTM F-2322-12	Wall panel
ASTM F-2696-15 Grade 3	Ceiling system
ASTM F-1450-12a	Frame
ASTM F-1450-12a	Door
ASTM F-1450-12a	Access panel
DETENTION LOCKS	
ASTM F-1577-01	Detention Locks
ASTM F-1577-05	Swing Door Locks
ASTM F-1758-96	Cycle, Overload, Impact - Detention Hinges
ASTM F-1577-01	Cycle, Cylinder, Release force, Horizontal Impact - 1010A Detention Locks
ASTM F-1577-96	Retraction Force, Release Force, Cycle, Impact, Remote Cycle - 10120 Detention Locks
MODCORR / MSP HOLLOW METAL DOORS, HOLLOW STEEL DOORS, BLAST DOORS, FEBR DOOR MEET THE FOLLOWING TESTS	
UL 10C	Positive Pressure Test, Fire Rated Doors
UL 10B	Nuetral Pressure Test (UL 3 Hour Fire Rated), Fire Rated Doors
NFPA 105	Smoke Door Assemblies
NFPA 80	Fire Doors and Other Opening Protectives
ANSI/UL 1784	Air Leakage Tests, Door Assemblies
HMMA 863-04	Detention Hollow Metal Doors and Frames
ASTM F1450-05	**DETENTION HOLLOW METAL SWINGING DOORS ASSEMBLIES**
	• Door Assembly Impact Load Test • Door Static Load Test • Door Rack Test • Door Edge Crush Test
UL 752	Ballistic Resistance Levels 1-8
ASTM 1592-01	Removable Glazing Stop Test
ASTM B117	Salt Fog Test
ASTM D2247	Relative Humidity Test
ASTM D2485	Dry Heat Test
ASTM D2457	Electrical Resistance
ASTM D4521	Adhesion Test
ASTM D4585	Cleveland Condition
ASTM D4587	UV Con
ASTM D2794	Impact Test
ASTM D522	Mandrel Bend Test
ASTM D4060	Taber Abrasion
MSP Blast Door	**29 psi for a duration of 5.0 milliseconds**
ASTM F1758-05	MSP #850 Hinge Test
ASTM F1758-05	MSP #855 Hinge Test
ASTM 627	MSP Tool-Resisting Bars

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Assault, Impact and Load Testing
Fyffe, AL

2022.12.13
TCI-MSS-20221213-01

RADCO TWINING CONSULTING
18071 Mount Washington Street
Fountain Valley, CA 92708
Tel 949.553.0370
Fax 949.553.0371

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18071 Mount Washington Street
Fountain Valley, CA 92708
Tel 949.553.0370
Fax 949.553.0371

1.0 MEZZANINE LOAD TEST

Purpose of Test – To determine that the patented bolt on mezzanine structure exceeds the design criteria of 100 PSF live load.

Test Assembly – The test assembly consisted of the patented bolt on 7'-5" X 5'-0" mezzanine structural assembly fabricated utilizing C4 X 5.4 structural channel spaced at 2'-0" intervals perpendicular to cell front. The C-Channel is continuously welded to 1/2" X 9" carbon steel front toe kick plate and 1/4" X 4" cell mounting plate. The mezzanine structure was topped with a 3/16" carbon steel plate stitch welded at 1" on 12". The mezzanine structure was connected to the cell front using (10) 3/4" A325 bolts spaced 1-1/2" either side of the point where channel and mounting plate intersect, nuts were torqued to 150 PSF. Mezzanine is supported on cell front wall by 3" X 3" X 1/4" angle welded to cell front wall at 2" on 12". Mezzanine structure is not welded to the cell itself. Ref Figure MLT-1

Testing Load – A mass consisting of (3) 64-piece bundles containing C3 X 4.1 structural channel measuring 90 inches long, strapped together for a total of 192 pieces of channel weighing 5904 pounds total.

Testing Procedure – A measurement of 96-1/4" was taken at a marked point on the floor to the lower edge of the face toe kick plate. The load of 5904 pounds was applied to the mezzanine for a period of one minute and then removed. A subsequent measurement was taken and a deflection of 1/8" (0.125") was noted. The load was then re-applied for a sustained period of 2 hours and then removed; no additional deflection was observed. Ref Figure MLT-2

Test Results – Test exceeded design criteria. Minimal deflection with no cell distortion was noted.

Figure MLT-1

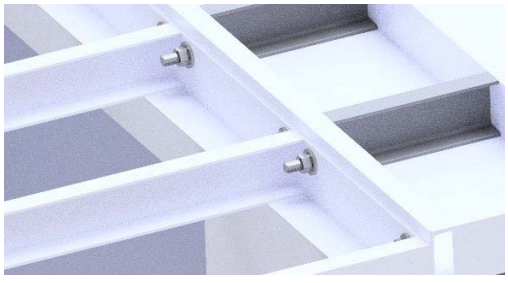

Figure MLT-2

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2.0 HORIZONTAL FLOOR ASSAULT TEST

Purpose of Test – To determine that the standard upper tier floor design will withstand extreme assault.

Test Assembly – The test assembly consisted of a section of floor 8'-0" X 8'-0" Ref Figure HWT-1. Fabricated from C4X5.3 channel spaced at 2'-0" centers and sheathed with 3/16" (0.1875") plate, stitch welded at 2" on 12". Ref Figure HFT-1

Figure HFT-1

Testing Method – A mass weighing 375 pounds dropped from a height of 10'-0" followed by a sharp impactor weighing 90 pounds dropped from a height of 10'-0".

Testing Procedure – A) From a height of 10'-0" a mass of 375 pounds was dropped 5 repetitions and subsequent deformation was recorded. After 5 repetitions in the same location, a slight crease running diagonally from a corner for a distance of 32" was noted. B) From a height of 10'-0" a sharp impactor weighing 90 pounds was dropped 3 repetitions in 3 separate locations. After each drop observations of damage were recorded. Each drop created a dent of approximately 1/8" (0.125") deep and ½" (0.500) in diameter. None of the impacts resulted in a breach of the floor. Ref Figure HFT-2 and HFT-3

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Fax 949.553.0371

Figure HFT-2

Figure HFT-3

Test Results – Test passed with no resulting breach only insignificant damage.

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3.0 HORIZONTAL CEILING ASSAULT TEST

Purpose of Test – To determine that the ceiling assembly and light plate will withstand assault from below.

Test Assembly – The test assembly consisting of (1) 8'-0" X 11'-0" ceiling structure with opening and back plate for recessed light fixture, fabricated using standard Maximum Security Systems construction methods from 3/16" plate and C4 channel material; attached to a frame, and welded solid as it would be to a cell wall, 30" above the floor and anchored in place. Ref Figure CAT-1

Figure CAT-1

Testing Load – Utilizing a 10-ton hydraulic ram fitted with a pressure gauge and plate delivering an upwards force equal to 3000 pounds per square foot (psf).

Testing Procedure – A 10-ton hydraulic ram was used to create a force equal to 3000 pounds per square foot (psf) of upwards force at 4 separate locations, each location was selected for its difference in structure and construction. A dial indicator was placed opposite each location and the deflection under load and then again after load was removed were recorded. Since the standard ceiling is fabricated without the presence of seams and all interior joints are fully welded there is no location suited to "pry testing". Ref table below and Figure CAT-2

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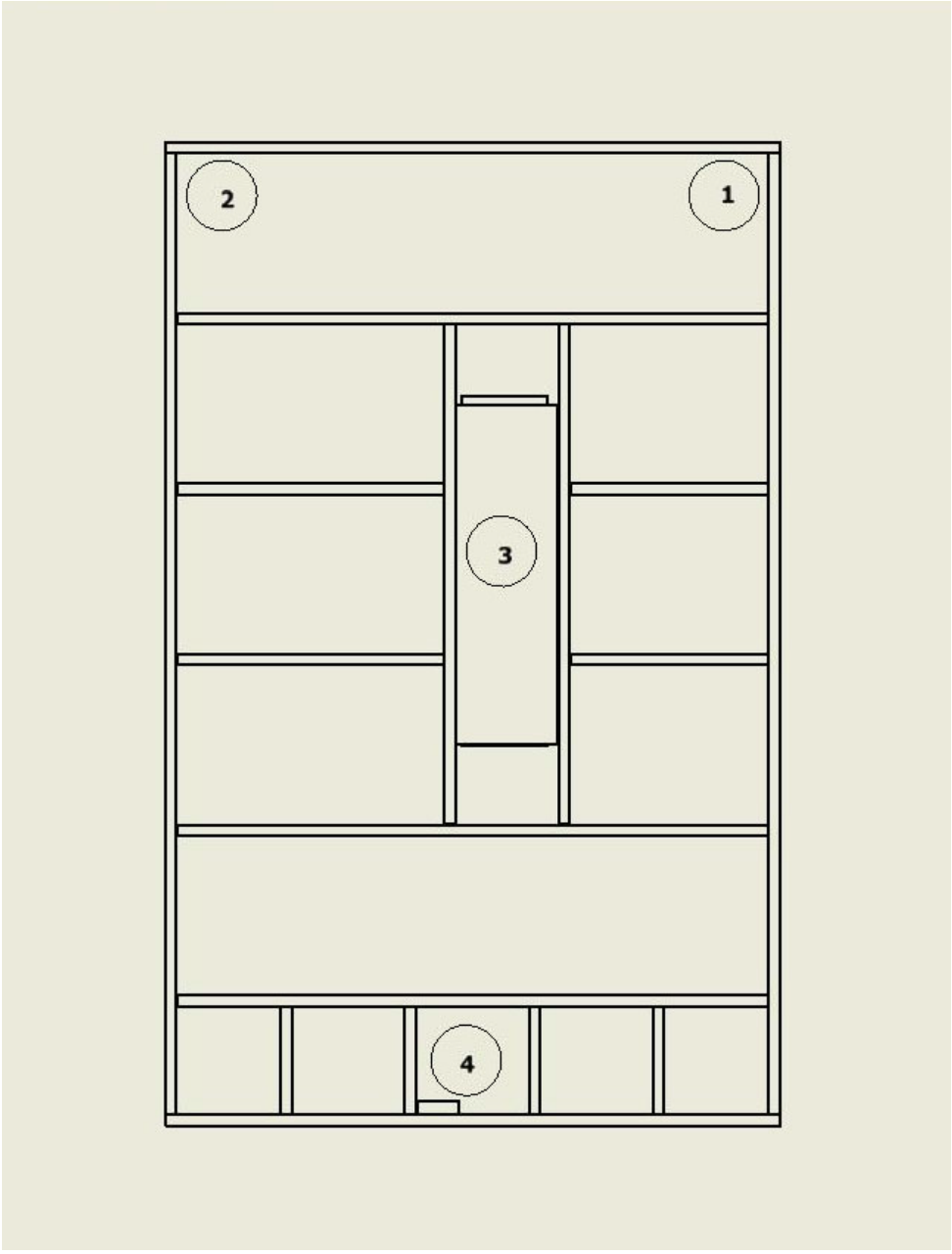
Location	Deflection Under Load (inches)	Permanent Deflection Post-Load (inches)
1 -Rear Corner	0.265	0.000
2- Rear Corner	0.235	0.001
3 -Light Plate	0.179	0.006
4- Front Center	0.085	0.000

Figure CAT-2



Test Results – Passed. Minimal deflection and no distortion was noted.

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4.0 VERTICAL WALL IMPACT TEST

Purpose of Test – To determine that the wall assembly will withstand physical assault.

Test Assembly – The test assembly consisted of a standard 8'-0" X 8'-0" ft cell side wall assembly, fabricated using C3X4.1 channel and 3/16" plate. The assembly was fabricated using typical side wall fabrication methods and anchored to the floor and braced at the corners using C6 channel. The impactor ram was suspended by cable from an A-frame structure and fitted to strike at a location 18" above the floor. Ref Figure WAT-1

Figure WAT-1

Testing Load – A 90-pound steel ram swung in a 4'-0" arc capable of delivering a minimum of 200 pounds per square inch (psi) force, fitted with a blunt or sharp impactor; tooled from 4140 prehard alloy steel. Ref Figures WAT-2 through WAT-4

Figure WAT-2

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Figure WAT-3

Figure WAT-4

Testing Procedure – Utilizing alternating repetitions of 50 blows each; first with the blunt, and then the sharp impactor until a total of 600 blows was reached. After each series of 50 blows; damage, deformation and potential for egress were recorded. Ref table below and Figures WAT-6 and WAT-7

No. of Impacts	Impactor Type	Distortion Observed	Deformation Observed	Perforated Hole Size	Potential for Egress
1-50	Blunt	Slight Blemish	None	None	Zero
51-100	Sharp	Slight Blemish	None	None	Zero
101-150	Blunt	Blemish	Slight	None	Zero
151-200	Sharp	Blemish	Slight	None	Zero
201-250	Blunt	Blemish	Slight	None	Zero
251-450	Alternating every 50	Several Blemishes	Less than 1/8”	None	Zero
451-500	Sharp	Multiple Blemishes	Less than 1/4”	None	Zero
501-600	Alternating every 50	Multiple Blemishes	Less than 3/8”	None	Zero

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Figure WAT-6

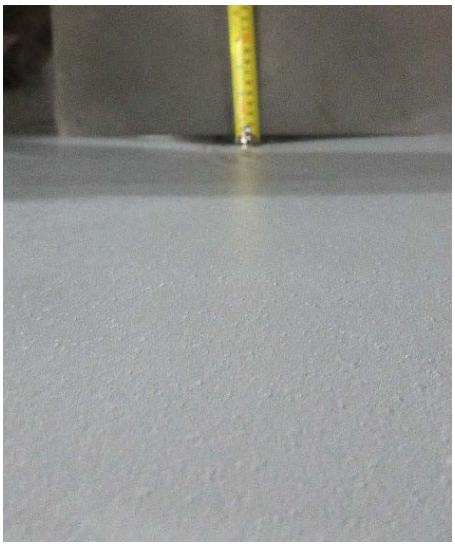
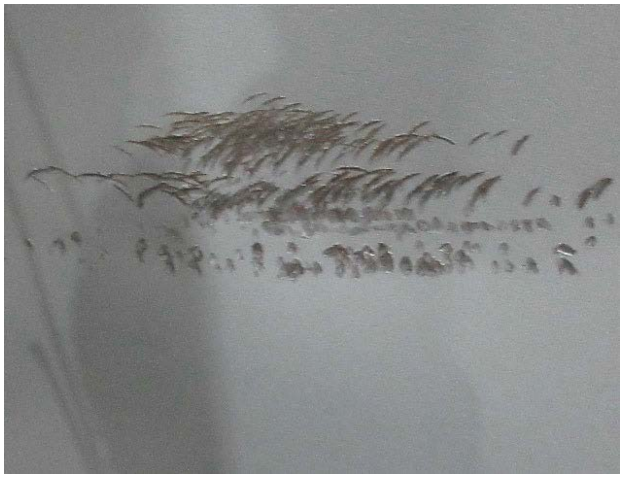


Figure WAT-7



It was noted that several strikes bounced off the wall and made a second impact outside of the target area.

After its final blow a measurement of deformation of the sharp impactor tip was recorded at 1/4" (.250"). Ref Figure WAT-8

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Figure WAT-8

Test Results – Passed. Minimal distortion and deformation were noted. Wall panel was not penetrated; egress is not possible.

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5.0 SEAT STATIC LOAD TEST

Purpose of Test – To determine that the seat assembly will withstand specified load.

Test Assembly – The test assembly consisting of a 12” X 18” seat, fabricated using standard methods from 3/16” plate; comprising a bent and formed top section and an enclosed bottom plate, fully welded with 3/16” bead to test wall. Ref Figure SLT-1

Figure SLT-1

Testing Load – 10 bags weighing 60 pounds each – totaling 600 pounds

Testing Procedure – 10 bags, weighing 60 pounds each placed 1 at a time. Deflection was recorded using a standard tape measure while under 600-pound load. No deflection was noted. Ref Figure SLT-2

Figure SLT-2

Test Results – Passed. No deflection and no distortion was noted.

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Fountain Valley, CA 92708
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Fax 949.553.0371

6.0 SEAT IMPACT TEST

Purpose of Test – To determine that the seat assembly will withstand specified impacts.

Test Assembly – The test assembly consisted of a 12" X 18" seat, fabricated using standard methods from 3/16" plate; comprising a bent and formed top section and an enclosed bottom plate, fully welded with 3/16" bead to test wall. Ref Figure SIT-1

Figure SIT-1

Testing Load – A mass of steel plate weighing 223 pounds dropped from a height of 18".

Testing Procedure – A mass of steel plate weighing 223 pounds dropped from a height of 18". Deflection was measured at a specified point from the floor using a standard tape measure. The testing procedure was repeated until no additional deflection was recorded. Ref Figure SIT-2

Figure SIT-2

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Test Results – Passed. Deflection and wall deformation as noted below:

Drop Number	Measured Deflection (this Drop)	Measured Wall Deformation
1	0	0
2	0.125”	0
3	0 additional	0.0625”

Total Deformation = 0.125”

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7.0 WALL MOUNTED STOOL IMPACT TEST

Purpose of Test – To determine whether a wall mounted stool assembly will withstand specified impacts.

Test Assembly – The test assembly consisted of a wall mounted stool assembly, fabricated using standard methods from 2" X 4" tube and 3/16" mounting plate; fully welded with 3/16" bead to test wall and extending 26" from the wall. Ref Figure STOOL-1

Figure STOOL-1

Testing Load – A mass of steel plate weighing 223 pounds dropped from a height of 24"

Testing Procedure – A mass of steel plate weighing 223 pounds dropped from a height of 24". Deflection was measured at a specified point from the floor using a standard tape measure. The testing procedure was repeated until no additional deflection was recorded. Ref Figure STOOL-2

Figure STOOL-2

Test Results - After 3 impacts a total deflection of 1-1/4" (1.250") was recorded with slight wall deformation.

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8.0 TABLE STATIC LOAD TEST

Purpose of Test – To determine that the table assembly will withstand specified loads.

Test Assembly – The test assembly consisted of an 18" X 30" table, fabricated using standard methods from 3/16" plate; comprising a bent and formed top section and an enclosed bottom plate, fully welded with 3/16" bead to test wall. Ref Figure TLT-1

Figure TLT-1

Testing Load – 10 bags weighing 60-pounds each – totaling 600 pounds

Testing Procedure – 10 bags, weighing 60-pounds each, placed 1 at a time. Deflection was recorded using a standard tape measure while under 600-pound load. No deflection was noted. Ref Figure TLT-2

Figure TLT-2

Test Results – Passed. No deflection and no distortion was noted.

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9.0 TABLE IMPACT TEST

Purpose of Test – To determine that the table assembly will withstand specified impacts.

Test Assembly – The test assembly consisted of an 18" X 30" table, fabricated using standard methods from 3/16" plate; comprising a bent and formed top section and an enclosed bottom plate, fully welded with 3/16" bead to test wall. Ref Figure TDT-1

Figure TDT-1

Testing Load – A mass of steel plate weighing 223-pounds dropped from a height of 18".

Testing Procedure – A mass of steel plate weighing 223 pounds dropped from a height of 18". Deflection was measured at a specified point from the floor using a standard tape measure. The testing procedure was repeated until no additional deflection was recorded. Ref Figure TDT-2

Figure TDT-2

Test Results – Passed. Deflection and wall deformation as noted below:

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Drop Number	Measured Deflection (this Drop)	Measured Wall Deformation
1	0	0
2	0	0
3	0 additional	0

Total Deformation = 0

Additional drops for extreme impacts; 1 drop each utilizing the same 223-pound mass at 60" above table and again at ***12'-0"*** above table were performed and deflection was noted; at 60". 3/16" deflection was noted. At ***12'-0"*** the 223-pound mass dented the tabletop as a result of landing on edge instead of flat, forming a crease measuring 1/2" deep that radiated through to the bottom of the table and deformed the bottom plate approx. 3/16". Total deflection measured was 1/2". No damage to the welds and only slight wall deformation were recorded. Ref Figure TDT-3

Figure TDT-3

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10.0 BUNK IMPACT TEST

Purpose of Test – To determine that the bunk assembly will withstand specified impacts.

Test Assembly – The test assembly consisted of 30” X 74” bunk, fabricated using standard methods from 3/16” plate bunk pan, a 2” formed lip, below bunk storage cubbies and a 16” triangular bunk gusset. The bunk is fully welded to test walls both at the rear and side edge opposite the gusset. The open end of the bunk is supported by a triangular bunk gusset. Welds are 3/16” fillet bead. Mounting brackets attached to sample wall allow for mounting of hydraulic cylinder and provide no structural support. Deflection was recorded using a standard tape measure from the floor at center of the pan and floor to the front lip then again from sample wall to lip. Ref Figure BIT-1

Figure BIT-1

Testing Load – A double mass of steel plate weighing 223-pounds each dropped from a height of 18”.

Testing Procedure – A double mass of steel plate weighing 223 pounds each dropped from a height of 18”. Deflection was measured at a specified point from the floor using a standard tape measure at 3 separate locations. The testing procedure was repeated until no additional deflection was recorded. Ref Figure BIT-2

Figure BIT-2

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Test Results - Deflection and deformation were recorded as follows:

Drop Number	Deflection Floor to Lip	Deflection Center of Bunk Plate	Deflection Wall to Lip	Deflection at Bunk Gusset
1	0.125”	0.250”	0	0
2	0.0625”	0.250”	0	0
3	0	0	0.0625”	0
4	No Additional	No Additional	No Additional	0

Total Deflection = 3/16” (0.1875”)

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11.0 BUNK STATIC LOAD TEST

Purpose of Test – To determine that the bunk assembly will withstand specified loads.

Test Assembly – The test assembly consisted of 30” X 74” bunk, fabricated using standard methods from 3/16” plate bunk pan, a 2” formed lip, below bunk storage cubbies and a 16” triangular bunk gusset. The bunk is fully welded to test walls both at the rear and side edge opposite the gusset. The open end of the bunk is supported by a triangular bunk gusset. Welds are 3/16” fillet bead. Mounting brackets attached to sample wall allow for mounting of hydraulic cylinder and provide no structural support. Ref Figure BLT-1

Figure BLT-1

Testing Load – A load was applied using a hydraulic cylinder fitted with a pressure gauge, bearing on a plate measuring 18” X 24”.

Testing Procedure – A load was applied, and measurements taken at 100 pounds of force, 500 pounds of force, 1000 pounds of force and finally at 2000 pounds of force. Testing was performed at the center of bunk pan and at front open corner. Deflection was recorded using a standard tape measure from the floor at center of the pan and floor to the front lip. Ref Figure BLT-2

Figure BLT-2

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Test Results - Deflection and deformation were recorded as follows:

Pressure (psi)	Deflection Floor to Lip	Deflection Center of Bunk Plate	Deflection Wall to Lip	Deflection at Bunk Gusset
100	0.125”	0.250”	0	0
500	0.0625”	0.250”	0	0
1000	0	0	0.0625”	0
2000	No Additional	No Additional	No Additional	0

Total Deflection under load = 3/16” (0.1875”) rebound deflection = 0
No failed or cracked welds – No pan or gusset deformation

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12.0 BUNK STATIC UPLOAD TEST

Purpose of Test – To determine that the bunk assembly will withstand specified loads from upwards pressure.

Test Assembly – The test assembly consisting of 30” X 74” bunk, fabricated using standard methods from 3/16” plate bunk pan, a 2” formed lip, below bunk storage cubbies and a 16” triangular bunk gusset. The bunk is fully welded to test walls both at the rear and side edge opposite the gusset. The open end of the bunk is supported by a triangular bunk gusset. Welds are 3/16” fillet bead. Mounting brackets attached to sample wall allow for mounting of hydraulic cylinder and provide no structural support. Ref Figure BUT-1

Figure BUT-1

Testing Load – A load was applied using a hydraulic cylinder fitted with a pressure gauge, bearing on a plate measuring 18” X 24”.

Testing Procedure – An upwards load was applied, and measurements taken at 100 pounds of force, 500 pounds of force, 1000 pounds of force and finally at 2000 pounds of force. Testing was performed at the center of bunk pan. Deflection was recorded using a standard tape measure from the floor at center of the pan and floor to the front lip.

Pressure (psi)	Deflection Floor to Lip	Deflection Center of Bunk Plate	Deflection Wall to Lip	Deflection at Bunk Gusset
100	0	0.125”	0	0
500	0.125”	0.250”	0	0
1000	0.125”	0.500”	0	0
2000	No Additional	No Additional	No Additional	0

Total deflection at bunk center = .500” rebound deflection = 0
No failed or cracked welds – No pan or gusset deformation

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13.0 EXTREME BUNK STATIC LOAD TEST

Performed on separate bunk than test 1, fabricated in exact manner with the exception of the hydraulic cylinder mounting brackets and under bunk storage bins. Ref Figure CLT-1

Figure CLT-1

Testing Load – 3 separate loads applied in sequential order.
Load 1) 650 pounds
Load 2) 2495 pounds total
Load 3) 4340 pounds total

Testing Procedure – 3 separate bundles of C3 X 4.1 channel, totaling 4340 pounds were applied to the bunk sequentially and deflection was recorded under load after each bundle was placed, utilizing a stand mounted dial indicator. Ref Table and Figure CLT-2

Bundle	Bundle Weight (pounds)	Total Load (pounds)	Deflection Under Load (pounds)
1	650	650	.070”
2	1845	2495	.298”
3	1845	4340	.504”

After the load was removed, total permanent deflection of bunk pan was measured at .198 inches. Some minor gusset deformation of <.125” was noted. No cracked or failed welds and no loss of structural integrity were noted.

Figure CLT-2

Test Results – Passed. Minimal deflection and distortion were noted, no weld failure.