

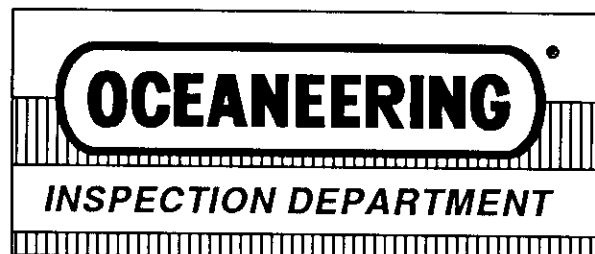
**UNDERWATER INSPECTION
OPERATIONS REPORT**

FOR PMB / BECHTEL

CHEVRON PLATFORMS

ST 130 A	INSP. NO 93/070	11/11/93
ST 130 QTRS.	INSP. NO 93/071	11/18/93
ST 151 K	INSP. NO. 93/072	11/16/93 11/17/93

OII JOB NO. 15855



**UNDERWATER INSPECTION
OPERATIONS REPORT**

**Chevron's Structures
ST 130 A, ST 130 QTRS, ST 151 K**

November 1993

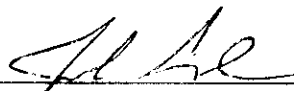
ABSTRACT

This report documents the work performed by OCEANEERING INTERNATIONAL in November 1993 to identify the failure mode of the platform ST 130 A, and to identify any underwater damage to platforms ST 151 K and ST 130 QTRS, such as failed "K" joints, buckled legs or any gross defects, bulges, cracks or tears.

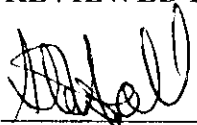
PREPARED BY:

**Kenneth Edwards
Project Diving Superintendent**

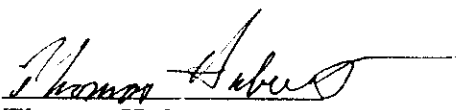
REVIEWED BY:


**Jack Couch
Bids and Proposals Manager**

REVIEWED BY:


**Steve Hall
Diving Operations Manager**

REVIEWED BY:


**Thomas Hubert
Inspection Manager**

**Underwater Inspection
Chevron's Structures
ST-130 A, ST-130 QTRS, ST-151 K**

November 1993

PERFORMED FOR:

PMB/Bechtel
500 Sansome Street, Suite 100
San Francisco, CA 94111-3219
PMB Job No. 88967-312
Under Contract No. 14-35-0001-30700 for the Minerals Management Service

BY:

OCEANEERING INTERNATIONAL, INC.
P.O. Drawer H
Morgan City, LA 70381

TABLE OF CONTENTS

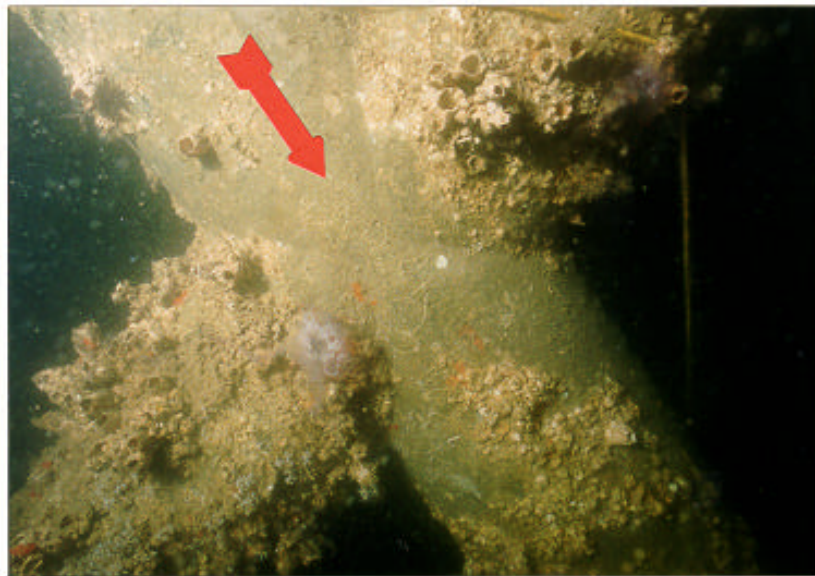
Section	Page
EXECUTIVE SUMMARY	v
GENERAL INSPECTION PROCEDURES	vi,vii
1 Scope of Work ST - 130 A.	1-12
1.1 Completed Task Summary	2,3
1.2 Inspection Results ST - 130 A.	4,5
1.2.1 Visual Inspection Results - Broken Leg Ends	4
1.2.2 Visual Inspection Results - "K" bracing	4
1.2.3 Visual Inspection Results - "X" bracing	4
1.2.4 Video Inspection Results	5
1.2.5 A1 -65' Node	5
1.2.6 B1 -65' Node	5
1.2.7 C1 -65' Node	5
1.2.8 D1 -65' Node	5
1.3 Selected Photos	6-10
1.4 Photo Log.	11
1.5 Video Log.	12
2 Scope of Work ST - 151 K	13-29
2.1 Completed Task Summary	15
2.2 Inspection Results ST - 151 K.	15,16
2.2.1 MT Inspection Results.	15
2.2.2 FMD Inspection Results	15,16
2.2.3 Visual Inspection Results	16
2.2.4 Figure 1 Drawing	17
2.3 Inspection Forms	18-21
2.4 Selected Photos	22-26
2.5 Photo Log.	27-29
3 Scope of Work ST - 130 QTRS	30-44
3.1 Completed Task Summary	32
3.2 Inspection Results ST - 130 QTRS	32
3.2.1 MT Inspection Results.	32
3.2.2 FMD Inspection Results	32
3.2.3 Visual Inspection Results	32
3.2.4 Figure 2 Drawing	33
3.3 Inspection Forms	34-37
3.4 Selected Photos	38-42
3.5 Photo Log.	43,44
4 Problems Encountered	45

5 Recommendations	45
6 Appendices	46-56
A Equipment/Personnel Requirements	47
B Job Log.	49-52
C Diving statistics.	54
D Abbreviations.	56
E Supplementary Photos	57-86

Photographs ST - 130 A



Roll #1-F2 D1/D2 "X" brace taken from outboard side of "X"



Roll #1-F3 D1/D2 "X" brace taken from inboard side of "X"

EXECUTIVE SUMMARY

On November 11, 1993, Oceaneering was tasked to supply diving personnel and equipment to assist PMB/Bechtel in a post Hurricane Andrew, underwater inspection of the toppled Chevron structure South Timbalier (ST) 130-A and two standing structures, ST-130 QTRS, and ST-151 K. The inspection work was conducted as part of a study for the Minerals Management Service (MMS) investigating the effects of Hurricane Andrew on offshore platforms.

A crew of five divers and five tenders mobilized from Oceaneering's Gulf Coast office to Fourchon, LA, at John W. Stone loading dock to load survey equipment and personnel aboard the M/V Mr. Cliff.

The M/V Mr. Cliff, with the diving and survey personnel onboard, arrived at the first work site South Timbalier 130-A and commenced diving operations at 09:00. Time was of the essence because of the impending rough weather forecasted for the next couple of days.

One day of inspection was completed before the weather compelled the diving boat and crew to return to Fourchon's dock. A weather waiting period of four days was required before the M/V Mr. Cliff, along with the diving crew, could return to the work site.

Returning to the field on November 16, another three days were required to finish the inspection of the two standing structures.

A PMB/Bechtel representative was on board the Mr. Cliff at all times in order to help guide the inspection work.

This report documents results of the inspections including schematics, photos and video, supplemented by narrative where appropriate. This report does not contain any speculation as to how any platform damage may have occurred. (See separate PMB/Bechtel report)

GENERAL INSPECTION PROCEDURES

Flooded Member Inspection (FMD)

The detection of flooded members indicates through wall corrosion, cracks, dents, or fabrication damage such as undetected through wall scarf marks.

In a flooded member, a flooded member signal is indicated by obtaining a reflection of the ultrasound from the opposite side of the member by the transmission of sound through the water contained in the suspected member. Where there is no liquid level present, a back reflection from the front wall will be the only echo seen of the ultrasonic machine. An ultrasonic signal is readily transmitted across the member if it is flooded but is not reflected from the back wall if it is air filled or has an air gap.

All major members were inspected with the FMD detection instrument. Members that connected row to row, elevation to elevation, or side to side were considered major structural members.

Magnetic Particle Inspection (MT)

Magnetic Particle Inspection (MT) is one of several methods of nondestructive testing that can be used to gain knowledge of the condition of ferromagnetic materials and structures built of these materials. Underwater MT inspection is well suited to the detection of surface cracks and is therefore widely used on structures subject to bending stresses and fatigue cracking. Typically, the surface on which underwater MT inspection is performed must be devoid of all coatings.

Visual Inspection (VT)

A general 100% visual inspection survey of the nodes and members was performed to confirm that there were no missing members, gross joint cracks, dents, distortions, misalignment or other conditions that might indicate a damaged component. Any signs of damage, lack of members' integrity or other anomalies were documented with still photos, video or drawings.

Indications of marine growth or coating scuffing were considered evidence of impact or stress damage. Areas with these indications were closely investigated.

General Video Survey

The purpose of a video inspection by a diver using a hand-help or hat-mounted video camera is for realtime documentation of the "as found" visual condition or the continuing observation of work being performed.

Inspection Forms

Areas with visual damage, MT or FMD indications will have inspection forms completed. Other inspection sites with no MT, FMD or visual signs of damage will have no inspection forms completed.

1 Scope of Work ST 130-A, Toppled in Hurricane Andrew

The following is the original Oceaneering Scope of Work as defined by PMB/Bechtel prior to the inspection. The actual work performed varied somewhat to account for conditions found in the field.

This platform has 8 legs and its water depth is 140 feet.

The intent of this inspection is to identify the failure mode of the platform (failed k joints, buckled leg, etc.). In addition to diver inspection of the toppled platform, sonar imaging will be used to obtain an overall image of the wreckage to assist in identifying the platform failure mode. There is no cleaning of member/joints currently planned for this structure. This will be the first platform inspection to take advantage of clear weather.

A previous inspection by Chevron indicates that the platform appears to have "broken" just above the first level above the seafloor. The base still seems to be intact and there appears to be no substantial tilting. The upper section is also somewhat intact and has fallen over to the northwest in the direction of the maximum Andrew waves. Chevron indicates that there appeared to be a combination of joint and leg failures.

Note: There is no nearby platform to moor to for this inspection, therefore, the dive vessel will be moored to a large leg section of the debris.

1. Obtain an overall "view" of wreckage using Mesotech sonar imaging - The Mesotech will be mounted on a tripod base and then placed on the seafloor at several locations around the wreckage to obtain images from several directions.

2. Diver swim-by of wreckage - divers produce some hand sketches of how the wreck is oriented, what leg is severed and where, any broken joints, etc. Note: Divers should not penetrate debris if hazardous conditions exist.

3. Member Specific Visual Inspection (No cleaning) - In addition to or as part of the swim by, perform a more careful visual inspection of the following members looking in particular for buckling. No cleaning is required. Three members will be inspected as a start, six if time permits.

- Members are as follows in order of preference . If member is inaccessible an alternate will be selected.

1. VD A3 -105' to A2 -140'
2. VD B2 -105' to B1 -140'
3. Vertical X brace B2 0 to B3 -35' (look for crack along brace at center joint at -17')

4. Vertical X brace A3 0 to A4 -35' (look for crack along brace at center joint at -17')
5. VD A4 -70' to A3 -105'
6. VD B3 -70' to B2 -105'

4. Joint Specific Visual Inspection (No cleaning) - In addition to or as part of the swim by, perform a more careful visual inspection of the following joints looking in particular for tears, bulges or cracks. No cleaning is required. Three joints will be inspected as a start, six if time permits.

- Joints are as follows in order of preference. If a joint is inaccessible an alternate will be selected.

1. X joint, Row 2, elev. -17'
2. K joint, Row 2, elev. -35'
3. KT joint, Row 2, elev. -105'
4. K joint, Row 2, elev. -70'
5. K joint, Row 1, elev. -35'
6. KT joint, Row 1, elev. -105'

5. Potential foundation failure will be investigated (pile pullout/plunging).

- Check if base section is still level. The procedure for this will be discussed further once the condition of the wreckage is determined.

1.1 Completed Task Summary

The Chevron structure, South Timbalier 130-A, is an eight-pile structure with a six-leg topside platform installed. This structure was toppled during Hurricane Andrew.

After arriving at the work site, a buoy was dropped at the coordinates supplied by PMB/Bechtel. This buoy was used in visually positioning the dive boat while using the Mesotech underwater sonar search unit to locate and chart the toppled deck section.

The structure was located and new coordinates were generated by the survey operator to drop a new buoy closer to the structure before commencing live boating operations. This new buoy was deployed and the position was verified by the survey operator. However, before making the first dive, the survey operator informed us that the buoy was a considerable distance from the intended location and would require repositioning. This buoy was retrieved and deployed in the new location. The coordinates were verified again by the survey operator. This time the buoy was within an acceptable range for diving operations to commence.

The first diver made a dive on the new buoy to secure a down line to a preselected mooring site on the toppled deck section. This location would be used to secure the dive boat to the structure

with a 2½" nylon line. Unfortunately this buoy was considerable distance from the toppled section and had to be moved closer to the structure before the diver could locate the structure using his 75' search line. After moving the buoy, the diver located the structure and secured a down line to the preselected mooring site.

The second diver fastened the 2½" nylon line to the structure. After the boat was safely attached, the second diver made a swift visual inspection of the structure's bracing to define the priority of inspection sites for the next series of dives.

The third diver started the video inspections of the selected "X" and "K" bracing. The upper elevations' "X" and "K" bracing and the broken ends of each of the "one" side legs were inspected and video documented.

The fourth diver attempted to inspect the bottom elevation and the corresponding broken ends of the "one" side legs. Unfortunately, due to the distance from the boat and the lack of visibility the diver was unable to inspect the entire bottom section. The diver did confirm that the D2 leg pile did not pull out from the bottom.

The fifth diver took still photos of selected "X" and "K" bracing and the upper ends of the "one" side broken legs. Upon completion of the photographs the diver released the boat from its mooring line.

The mooring line was retrieved and the diver decompressed. The remaining marker buoys were removed from around the site.

1.2 Inspection Results ST - 130 A

1.2.1 Visual Inspection Results - Broken Leg Ends

The inspection diver visually inspected the four broken leg ends on the toppled section: legs A1, B1, C1 and D1. Each leg was broken off approximately 5' below the -65' elevation and flattened from the 03:00 to 09:00 position as shown on photos #8 through #10.

Each leg end was visually inspected for the presence of grout in the vicinity of the break. No positive evidence of grout was found in any of the inspected legs.

It appears that the structure swayed back and forth in North and South directions until the legs crimped and failed at the -65' elevation. The upper section then fell to the Northwest of the base.

An attempt was made to inspect the corresponding damage leg ends connected to the base. The boat's mooring line length and the mooring position prevented the diver from reaching the main base section except for the D2 leg.

The D2 leg was inspected from the -65' elevation to the bottom. Sections of horizontal members extending out from the leg were inspected. Each section terminated out from the leg into mid water.

The bottom of the leg pile connection was inspected. The pile did not appear to be pulled out from the bottom.

The diver was unable to locate the "K" brace connection of the first elevation up from the bottom from leg D1 to D2.

1.2.2 Visual Inspection Results - "K" Bracing

A1/A2 -33' "K" brace; not inspected

B1/B2 -33' "K" brace; broken

C1/C2 -33' "K" brace; slightly deformed

D1/D2 -33' "K" brace; flattened from 03:00 - 09:00 (See Photos #4 and #5)

1.2.3 Visual Inspection Results - "X" Bracing

A1/A2 -15' "X" brace; not inspected

B1/B2 -15' "X" brace; cracked on the "C" side of the "X"

C1/C2 -15' "X" brace; bulged out, no visible cracks (See Photos #6 and #7)

D1/D2 -15' "X" brace; no cracks on "C" side, outboard side cracked (See Photos #2 and #3)

1.2.4 Video Inspection Results

A1/A2 -15' "X" brace; no deformation visible
A1/A2 -33' "K" brace; visually O.K.

1.2.5 A1 -65' NODE

VD (Vertical Diagonal) up to MP A1/A2 -33' still attached
HM (Horizontal Member) to A1/A2 -65' buckled, still attached
HM to A1/B1 -65' cracked, still attached
"K" brace A1/A2 -65' MP "K" broken off HM
HD (Horizontal Diagonal) to A1/B2 -65' sheared at leg
Leg A1 broken approximately 5' below node
Leg end crimped from 03:00 to 09:00 (See Photo #11)

1.2.6 B1 -65' NODE

HM B1/A1 -65' still attached
VD B1 -65' up to A1 -33' still attached
VD B1 -65' down to A1 -94' broken
VD B1 -65' up to C1 -33' still attached
HM B1/C1 -65' still attached
HD B1 to C1 -65' broken at leg weld
VD B1 down to C1 -94' buckled and bent parallel to HM
B1/C1 -65'; broken about 20' from leg B1
Leg B1 broken approximately 5' below node
HM B1/C1 broken at MP B1/C1 -65'
Leg end crimped from 03:00 to 09:00 (See Photo #10)

1.2.7 C1 -65' NODE

HM C1/B1 -65' still attached, cracked at leg
HM C1/D1 -65' still attached
HD C1/B2 -65' still attached
Leg C1 broken approximately 5' below node
Leg end crimped from 03:00 to 09:00 (See Photo #9)

1.2.8 D1 -65' NODE

HM D1/C1 -65' still attached
VD D1 down to C1 -94' buckled and broken
HD D1/C1 -65' still attached
HM D1/D2 -65' missing from leg
Leg D1 bent and buckled, heads toward bottom (See Photo #8)

Photo Log	Inspection No. : 93/070	Date 11/11/93
Roll # 1	Structure : Chevron's ST 130 A	Job No. 15855
Frame #	Description	
2	D1/D2 "X" BRACE FROM OUTBOARD SIDE	
3	D1/D2 "X" BRACE FROM INBOARD SIDE	
4	D1/D2 "K" BRACE FROM OUTBOARD SIDE	
5	D1/D2 "K" BRACE FROM INBOARD SIDE	
6	C1/C2 "X" BRACE FROM "B" SIDE	
7	C1/C2 "X" BRACE FROM "D" SIDE	
8	D1 LEG AT BOTTOM OF BROKEN END	
9	C1 LEG AT BOTTOM OF BROKEN END	
10	B1 LEG AT BOTTOM OF BROKEN END	
11	A1 LEG AT BOTTOM OF BROKEN END	

Video Log	Inspection No. : 93/070	Date 11/11/93
Tape # 1	Structure : Chevron's ST 130 A	Job No. 15855
Tape Count	Description	
0000	GETTING STARTED	
0026	DIVER IN WATER	
0035	B1 LEG DIVER TRAVELING DOWN	
0060	CONTINUE DOWN B1 LEG	
0074	FIRST ELEVATION	
0084	A1 NODE WHERE LEG IS BROKEN	
0117	5' BELOW A1/B1 -65' HM	
0135	SHEARED OFF HD MEMBER BEHIND LEG A1	
0152	A1/A2 HM NODE AT LEG A1	
0224	HM TO "K" BRACE SHOWING HEAVY MARINE GROWTH	
0375	"X" BRACE A1/A2 BETWEEN SURFACE & FIRST ELEV.	
0465	BROKEN OFF VD MEMBER @ A1/A2	
0690	A1/B1 HM	
0697	B1 VD DOWN TO A1 BROKEN OFF	
0722	BROKEN LEG AT B1	
0754	B1/C1 HM DIVER TRAVEL	
0754	VD DOWN TO C1 BUCKLED	
0789	BROKEN OFF HD BEHIND LEG B1	
0816	B1/C1 MP HM BROKEN IN HALF	
0835	C1/D1 HM CRACKED AT C1 LEG	
1060	BROKEN HM AT D2 LEG	
1089	TRAVEL TO 6' RISER LEG D2	

2 Scope of Work ST - 151 K, Survived Hurricane Andrew

The following is the original Oceaneering Scope of Work as defined by PMB/Bechtel prior to the inspection. The actual work performed varied somewhat to account for conditions in the field.

This platform has 8 legs and its water depth is 137 feet.

1. A swim by of the entire platform will be performed looking for gross defects (buckled members, disconnected joints ((particularly K joints)), etc).
2. Flooded members will be checked - all primary vertical and horizontal members (no conductors' guide framing, or appurtenance supports).

Note: Identification of a flooded member may result in modification to the inspection plans that follow.

3. Member Specific Visual Inspection (No cleaning)- In addition to or part of the swim-by, a more careful visual inspection of the following members will be performed looking in particular for buckling. No cleaning is required. Three members will be inspected as a start, six if time permits (primarily longitudinal framing).

- Members are as follows in order of preference:

1. VD A2 -100' to A2 -134'
2. VD B2 -100' to B1 -134'
3. Vertical X brace B2 +11' to B3 -26' (look for crack along brace at center joint at -7.5)
4. Vertical X brace A3 +11' to A4 -26' (look for crack along brace at center joint at -7.5)
5. VD A4 -63' to A3 -100'
6. VD B3 -63' to B2 -100'

Note: If damage is located, and if time permits, it may be decided to clean and inspect the member further.

4. Joint Specific Inspection (Cleaning)- A detailed survey of 3 heavily loaded joints will be completed (survey up to 6 if time permits).

- Joint will be cleaned for clearer visual. Cleaning should be in the general area of the joint looking for any gross defects (bulges, cracks, tears). An area extending approximately 12 inches from the weld outward along brace or chord should be sufficient. Removal of marine growth to bare "shiny" metal is not a requirement. Marine growth should be removed to the degree required to ensure that no gross defects are apparent.

- Photograph and videotape all cleaned joints from several angles.

- If damage is located, measure as required.

- Joints are as follows in order of preference for inspection.

1. X joint, Row 2, elev. -7.5'
2. K joint, Row 2, elev. -26'
3. KT joint, Row 2, elev. -100'
4. K joint, Row 2, elev. -63'
5. K joint, Row 1, elev. -26'
6. KT Joint, Row 1, elev. -100'

2.1 Completed Task Summary

On 16 November, 1993, the M/V Mr. Cliff returned to ST 151 K to continue the underwater inspection of the two standing structures.

Due to the weather, the Mr. Cliff had to tie off stern-to the A1/A2 side. The combination of high seas and this mooring position limited the access to the structure for the first diver's inspection. Midday the weather changed direction and the Mr. Cliff was moved and secured to the boat landing on the structure's side.

Figure 1 summarizes the results of the inspection. Eight flooded members were found during the Flooded Member (FMD) Inspection. After reviewing the FMD results, three of these flooded members were selected to have their distal ends cleaned of marine growth. Succeeding cleaning, a more detailed inspection was performed to ascertain the cause of flooding.

Initially three nodes were selected to be cleaned for Visual (VT) inspection and Magnetic Particle (MT) inspection to determine if damage had occurred during Hurricane Andrew. A straight edge (3' long, 2" wide, 1/4" thick steel) was used on the tops of the "K" braces' horizontal members to determine if the members had any indications of bowing-up from the storm forces. "X" braces were cleaned and visually inspected to determine if there was any bulging or cracking along the center line of the through member.

All non-cleaned "K" and "X" bracing was visually inspected for gross damage (bulges, large cracks or tears) from the storm.

2.2 Inspection Results

2.2.1 MT Inspection Results

Seven nodes were selected for MT inspection. No indications were found on six of the nodes. The horizontal member between A1 and B1 at the -64' elevation, at the B1 leg node, had an area 5/8" long and 1/4" wide at the 06:00 position where there was no weld metal. This area previously had a construction padeye attached to the horizontal member. See MT form MT-ST151K #1, Photo #-Roll #3, Frame #18.

2.2.2 FMD Inspection Results

Most major members had an FMD inspection performed. (See Figure 1) Eight members were found to have a positive (flooded) indication on the FMD instrument. See FMD form number FL-ST151K #1. Some members near the waterline were not checked for flooding due to lack of time.

The VD (vertical diagonal) from B2 -100' down to B1 -134' was found to be partially flooded from -106' downward (i.e. not flooded at the upper joint). At the upper end (-100'), the diver found a 4" pipe stuck in the sea floor with the tip ending next to leg B2. This VD was inspected for impact damage from this pipe. No evidence was found that the 4' pipe had impacted the VD. The VD from B2 down to A2 -134' was similarly found to be partially flooded from -105' downward.

2.2.3 Visual Inspection Results

No visual indication of gross joint cracks, dents, distortions, misalignment or other conditions that might indicate damaged components, were found during this inspection.

For flooded members, the 3" diameter anode support bars were also cleaned at the intersection with the flooded member and closely inspected visually for cracks. In some cases an MPI was performed. No visible cracks or indications were found at any of these locations.

FLOODED MEMBER INSPECTION REPORT

Client's Ref. Number : 88967-312

File H:\WPWIN60\WPD0CS\MTST151K.WK4

©Edwards

OI Job Number : 15855

OI Inspection Number : 93/072

Date : 11/11/93

Form Number FL-ST151K-#1

Reference Form Number : * See Comments

Page : 1 of 1

GENERAL INFORMATION

Client : **PMB/BECHTEL**

Contractor : **OCEANEERING INT.** Cert.

Client's Representative : **F. PUSKAR**

Underwater Inspector : **B. TORLINE** UT II

Structure ID : **ST - 151 K CHEVRON**

Topside Inspector : **K. EDWARDS** UT III

Diving Supervisor : **K. EDWARDS**

EQUIPMENT INFORMATION AND SPECIFICATIONS

UT Machine : **USL-37** Model

Damping Setting : **0**

Probe Model : **AEROTECH**

Cable Type : **RG-59U**

Frequency Setting : **2.5 Mhz**

Gain Setting Cal : **42 DB**

Probe Freq. : **1.0 Mhz**

Cable Length : **500 Feet**

Reject Setting : **0**

Gain Setting Search : **62 DB**

Probe Size : **.5X1 Inches**

Delay Setting : **0**

Screen Calibration : **50 Inches**

Probe Type : **S Square Round**

TEST RESULTS

Test No.	Member Location	Survey Points						Flooded		Int. Depth	% Flood	Cause of Flooding Thick Remarks	Com No.	Photo Video
		12:00	03:00	06:00	09:00	Top	Bot	Y	N					
1	VD C1 -134' TO D1 -100'		Y	Y				Y		106	83%	.438 UNDETERMINED		
2	HD B1 -63' TO C2 -63'			Y				Y				.438 UNDETERMINED		
3	HD B1 -26' TO MP B2/C1			Y				Y				.438 UNDETERMINED		
4	HM A1 -63' TO B1 -63'			Y				Y				.438 HOLE 06:00 AT B1 LEG	1	Roll #3, #18
5	VD A1 -23' TO B1 +12		Y	Y				Y				.438 UNDETERMINED		
6	HM A1 -134' TO B1 -134'			Y				Y				.438 UNDETERMINED		
7	HD A2 -134' TO MP A1/B2			Y				Y			100%	.438 UNDETERMINED	2	
8	VD A2 -134' TO B2 -100'		Y	Y				Y		105	83%	.438 UNDETERMINED	2	Roll #4, #4
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														

COMMENTS

Com No.	Comments	Figure No.
1	B1 -100' AT 06:00, THE HM HAD AN AREA 5/8" LONG BY 1/4" WIDE OF LACK-OF-WELD MATERIAL.	
2	THE 09:00 WELD ON THE VD TIES IN TO THE HD, THIS AREA OF WELD HAD HIGH POROSITY IN THE WELD.	

FINAL EVALUATION

Final Evaluation :

MAGNETIC PARTICLE INSPECTION REPORT

Client's Ref. Number : 88967-312

File HWPWIN60/WPDOCSMTST151K.WK4

Edwards

OI Job Number : 15855

OI Inspection Number : 93/072

Date : 11/17/93

Form Number MT- ST151K #1

Reference Form Number :

Page : 1 of 1

GENERAL INFORMATION

Client : PMB/BECHTEL

Contractor : OCEANEERING INT.

Cert.

Client's Representative : F. PUSKAR

Underwater Inspector : B. TORLINE

MT-II

Structure ID : ST-151 K

Topside Inspector : K. EDWARDS

MT-III

Joint/Weld ID : HM A1/B1 -64' @B1

Diving Supervisor : K. EDWARDS

VISUAL INSPECTION RESULTS

Visual Indication : Y (Yes)(No)

Indication Location Weld : B Tow Haz Bead B Brace Chord

Clock Position : 6 To 6

Est. Width : > (>)(<) Hairline <OR>

Visual Length : 5/8"

Visual Width : 1/4"

Visual Material Separation : Y (Yes)(No)

Visual Depth : .5 "

MAGNETIC PARTICLE INSPECTION RESULTS

MT Indication : Y (Yes)(No)

MT Indication ID Number : HM A1/B1 -64 @B1

Clock Position : 6 To 6

Indication's Location Weld : B Tow Haz Bead B Brace Chord

MT Length : 5/8 Inches (Meas.) (Est.)

Orientation : L Longitudinal Transverse Both

Particle Build-up : II Heavy Moderate Light

Confirmatory Grinding : N (Yes)(No)

Particle Adhesion : M Strong Moderate Weak

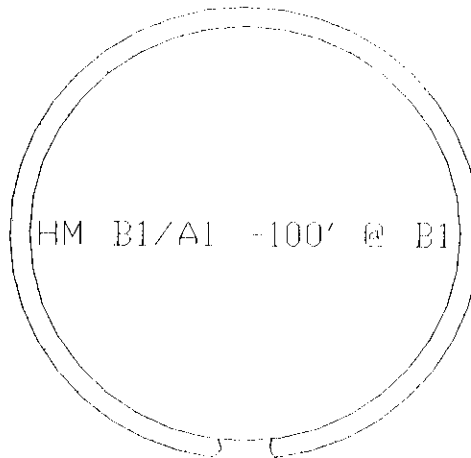
Re-Test Indication : N (Yes)(No)

Depth Estimate on Particle Appearance : >1/16 < or > 1/16"

Remedial Grinding : N (Yes)(No)

DRAWINGS AND NOTES

LEG B1



Area where there is Lack of weld metal 5/8" Long by 1/4" Wide

Signature U/W Inspector :

B. Torline

Signature T/S Inspector :

James J. Brown

FINAL EVALUATION

Final Evaluation : THE 06:00 POSITION OF THIS HM HAD A TEMPORARY CONSTRUCTION PADEYED INSTALLED AT THIS LOCATION. THERE IS A LACK OF WELD MATERIAL . THE HM A1/B1 -64' WAS FLOODED

DOCUMENTATION

Photo's Roll Number : Roll #3, Frame #18

VISUAL INSPECTION TECHNIQUE

Visual Inspection Technique : **See Visual Inspection Procedure Sheet OI**

Edwards

Light Source : **Snooperette 30 Volts, 80 Watts**

Surface Preparation : **OCEANCLEANED**

Physical Measuring Tools : **Pit Gauge, Tape Measure**

Surface Condition : **BM Black Oxide Bare Metal**

MAGNETIC INSPECTION TECHNIQUE

Magnetic Particle Inspection Technique : **See MT Inspection Procedure Sheet OI**

Acceptance Standards : **As Per OI**

YOKE

Yoke Type : **Electromagnetic Articulating 110 VAC (Parker)**

Yoke Field Strength Calibration : **10 lb. Steel Flat Plate**

SURFACE PREPARATIONS METHOD

PARTICLES

Surface Preparation : **Oceancleaned**

Particle Type : **Mi-Glow #1 (Circle Chemical Co.)**

Surface Condition : **BM Black Oxide Bare Metal**

Particle Concentration Indicator : **Pie Type**

TESTING METHOD

Particle Delivery System : **10 oz. Squeeze Bottles**

Magnetic Field : **AC Continuous, Flux Path Field**

LIGHT SOURCE

Yoke Coverage : **Longitudinal, 2 inch Movements**

Light Source : **Birns Snooperette**

Magnetic Field Strength : **> 30 Oe**

Light Intensity : **30 Volts, 80 Watts > 200 ft. Candles**

CONFIRMATORY GRINDING TECHNIQUE (NOT USED IN THIS INSPECTION)

Grinding Burr Diameter : **0.5** *Minimum Diameter 1/2"*

The objective of confirmatory grinding is to remove or attempt to remove indications of known crack-like defects. Grinding shall be carried out using appropriate burrs with a minimum diameter of 1/2" and shall be orientated such that the score marks are approximately at right angles to the weld's toe. The maximum total depth of grinding shall be limited to 1/16". Grinding shall be carried out in a series of passes. The maximum depth of grinding in any one pass shall be limited to 1/32". After each pass, MT inspection shall be carried out. The grinding sequence will continue until either the indications disappear or the maximum grinding depth is reached.

Confirmatory grinding requires client's prior approval.

Consolidated MT Inspection Report

ST 151 K

Member ID	MT Defect	MT Form #	Photo	Description
VD -134' A2 up to B2 -100'	N	NONE	Roll #4 4/8	Porosity in weld on VD at 09:00 Position
Vertical from VD A2 -134' to HM A2/B2 -134'	N	None	Roll #4 8	No MT or VT indication VD A2 -134' up to B2 -100' is flooded
HM A1/B1 -63' at A1 leg	N	None	Roll #3 1	No MT or VT indication member is flooded
HM A1/B1 -63' at B1 leg	Y	ST151K	Roll #3 7/13	MT indication 06:00, Lack of weld metal
VD C1 -134', up to D1 -100'	N	None	Roll #3 14/20	No MT or VT indication member is flooded
Vertical from VD C1 -134' to HM C1/D1 -134'	N	None	Roll #3 5/6	No MT or VT indication. VD C1 -134' up to D1 -100' is flooded
MP C2/C1 -23' VD down to C1 -63'	N	None	Roll #2 8/9	No MT, FMD or VT indication
MP C2/C1 -23' VD down to C2 -63'	N	None	Roll #2 8/9	No MT, FMD or VT indication
C2 VD -63' down to D2 -100'	N	None	Roll #2 8/9	No MT, FMD or VT indication
C2 VD -63' up to D2 -26'	N	None	Roll #2 4/7	No MT, FMD or VT indication

Photo Log	Inspection No. : 93/072	Date 11/16/93
Roll # 2	Structure : Chevron's ST 151 K	Job No. 15855
Frame #	Description	
1	C1/C2 -100' "B" SIDE OF "K" BRACE SHOWING FLAT METAL BAR ON TOP OF JOINT	
2	C1/C2 -100' "D" SIDE OF "K" BRACE	
4	LEG C2 NODE -64' INBOARD "D" SIDE	
5	LEG C2 NODE -64' INBOARD "B" SIDE	
6	LEG C2 NODE -64' OUTBOARD "B" SIDE	
7	LEG C2 NODE -64' OUTBOARD "D" SIDE	
8	C1/C2 -23' "B" SIDE OF "K" BRACE	
9	C1/C2 -23' "D" SIDE OF "K" BRACE	

Photo Log	Inspection No. : 93/072	Date 11/16/93
Roll # 3	Structure : Chevron's ST 151 K	Job No. 15855
Frame #	Description	
1	VD C1 -134' UP TO D1 -100' 02:00	
2	VD C1 -134' UP TO D1 -100' 03:00	
3	VD C1 -134' UP TO D1 -100' 09:00	
4	VD C1 -134' UP TO D1 -100' 12:00	
5	VT BRACE FROM C1/D1 HM TO VD UP TO D1 INBOARD (ANODE BRACE)	
6	VT BRACE FROM C1/D1 HM TO VD UP TO D1 OUTBOARD (ANODE BRACE)	
8	HM A1/B1 -64' @ A1 INBOARD OVERALL	
9	HM A1/B1 -64' @ A1 OUTBOARD OVERALL	
10	HM A1/B1 -64' @ A1 09:00	
11	HM A1/B1 -64' @ A1 12:00	
12	HM A1/B1 -64' @ A1 03:00	
13	HM A1/B1 -64' @ A1 06:00	
14	HM A1/B1 -64' @ B1 INBOARD OVERALL	
15	HM A1/B1 -64' @ B1 OUTBOARD OVERALL	
16	HM A1/B1 -64' @ B1 12:00	
17	HM A1/B1 -64' @ B1 03:00	
18	HM A1/B1 -64' @ B1 06:00 SHOWING LACK OF WELD	
19	HM A1/B1 -64' @ B1 06:00	
20	HM A1/B1 -64' @ B1 09:00	
25	SET-UP OF MT INSPECTION EQUIPMENT	

Photo Log	Inspection No. : 93/072	Date 11/16/93
Roll # 4	Structure : Chevron's ST 151 K	Job No. 15855
Frame #	Description	
2	VD A2 -134' UP TO B2 -100' @ 09:00 SHOWING TIE-IN OF VD AND HD	
4	VD A2 -134' UP TO B2 -100' @ 09:00 SHOWING TIE-IN OF VD AND HD CLOSE-UP	
8	VT ATTACHED TO VD A2 -134' UP TO B2 -100' SHOWING LARGE PIT IN VD (ANODE BRACE)	

3 Scope of Work ST - 130 QTRS

The following is the original Oceaneering Scope of Work as defined by PMB/Bechtel prior to the inspection. The actual work performed varied somewhat to account for conditions in the field.

This platform has 4 legs and its water depth is 170 feet.

Note: The inspection tasks are similar to that described for ST 151 K with the exception of the different specific members for inspection. The specific member visual inspection has been deleted to allow more time for specific joint inspections.

In the event of unforeseen weather downtime or delays in inspecting the other platforms, this platform will be dropped from consideration.

1. A swim by of the entire platform will be performed looking for gross defects (buckled members, disconnected joints ((particularly K joints)), etc.)

2. Flooded members will be checked - all primary vertical and horizontal members (no conductors' guide framing, or appurtenance supports).

Note: Identification of a flooded member may result in modifications to the inspection plans that follow.

3. Joint Specific Inspections (Cleaning)- A detailed survey of 3 heavily loaded joints will be completed (survey up to 6 if time permits).

- Joint will be cleaned for clearer visual. Cleaning should be in the general area of the joint looking for any gross defects (bulges, cracks, tears). An area extending approximately 12 inches from the weld outward along brace or chord should be sufficient. Removal of marine growth to bare "shiny" metal is not a requirement. Marine growth should be removed to the degree required to ensure that no gross defects are apparent.

- Photograph and videotape all cleaned joints from several angles (approximately 4-6 photos per joint).

- If damage is located, measure as required.

- Joints are as follows in order of preference for inspection:

1. K joint, Row A, elev. -130'
2. K joint, Row 2, elev. -130'
3. K joint, Row A, elev. -95'
4. K joint, Row 2, elev. -95'
5. K joint, Row A, elev. -10'
6. K joint, Row 2, elev. -10'

- "X" joints Row A and 2 at the +1' elevation will also be inspected; no cleaning is required - check for cracks along members at the X joint.

3.1 Completed Task Summary

On November 17, 1993, the M/V Mr. Cliff arrived at the Chevron structure designated ST -130 QTRS. This is a four-pile structure in 170' of water. There are six underwater elevations.

Initially, four nodes were selected to be cleaned for Visual (VT) and Magnetic Particle (MT) inspection for Hurricane Andrew damage.

Figure 2 summarizes the results of the inspection. All major members were VT and FMD inspected for gross damage that would possibly indicate structural components' failure during the hurricane. The "X" and "K" bracing was visually inspected for deformity that would indicate high stress during the storm. The flat metal bar used on the ST 151-K inspection was also used here to check for gross deformation of the "K" joints. Five members were found to have a positive indication on the FMD instrument. All of these members were below the -130' elevation.

3.2 Inspection Results

3.2.1 MT Inspection Results

Initially, four nodes were selected for MT inspection. No indications were found on three of these nodes. The "K" brace from A1 -130' to A2 130' had one indication. This member was also one of the flooded members. The member was not completely flooded inferring that the MT indication was not a through wall defect. See MT form number MT-ST130Q #1.

Two additional nodes were selected for MT inspection after reviewing the FMD inspection results.

3.2.2 FMD Inspection Results

Every major member had an FMD inspection performed. Five members had a positive (flooded) indication on the FMD instrument. See FMD form number FL-ST130Q #1.

3.2.3 Visual Inspection Results

The VD from the MP of the horizontal from A1 to A2 -130' down to leg A2 @ -170' had one indication starting in the weld and propagating down the member.

No other visual indications of gross joints cracks, dents, distortions, misalignment or other conditions that might indicate damaged components were found during this inspection. Similar to ST 151-K, the 3 1/2" diameter anode supports on the flooded members were checked visually and with MPI at the intersection with the flooded member. No visual cracks or indications were found at any of these locations.

FLOODED MEMBER INSPECTION REPORT

Client's Ref. Number : **88967-312** File H:\WPWIN60\WPD\DCS\ST_130Q.WK4 ©Edwards
 OI Job Number : **15855** OI Inspection Number : **93/071** Date : **11/18/93**
 Form Number **FL-ST130Q-#1** Reference Form Number : * **See Comments** Page : **1** of **1**

GENERAL INFORMATION

Client : **PMB\BECHTEL** Contractor : **OCEANEERING INT.** Cert.
 Client's Representative : **F. PUSKAR** Underwater Inspector : **B. TORLINE** **UT II**
 Structure ID : **ST - 130 QTRS CHEVRON** Topside Inspector : **K. EDWARDS** **UT III**
Diving Supervisor : **K. EDWARDS**

EQUIPMENT INFORMATION AND SPECIFICATIONS

UT Machine : **USL-37** *Model* Damping Setting : **0** Probe Model : **AEROTECH** Cable Type : **RG-59U**
 Frequency Setting : **2.5 Mhz** Gain Setting Cal : **42 DB** Probe Freq. : **1.0 Mhz** Cable Length : **500 Feet**
 Reject Setting : **0** Gain Setting Search : **62 DB** Probe Size : **.5X1 Inches**
 Delay Setting : **0** Screen Calibration : **50 Inches** Probe Type : **S Square Round**

TEST RESULTS

Test No.	Member Location	Survey Points						Flooded		Int. Depth	%	Cause of Flooding Remarks	Com No.	Photo Video		
		12:00	03:00	06:00	09:00	Top	Bot	Y	N							
1	HD B1/A1 -170'			Y				Y						UNDETERMINED		
2	HD A1/MP B1/A2 -170'			Y				Y			100%			UNDETERMINED	1	
3	VD A1 -170' TO MP A1/A2		Y	Y				Y						UNDETERMINED	1	
4	IIM A1/A2 -170'		Y	Y				Y			50%			UNDETERMINED	1	
5	VD A2 -170 TO MP A1/A2		Y	Y				Y		136'	85%			UNDETERMINED	2	Roll #6, 20
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																

COMMENTS

Com No.	Comments	Figure No.
1	AT THE COMMON WELD BETWEEN THE HD AND VD, THE VD HAD HEAVY UNDERCUTTING ON THE CHORD SIDE OF WELD.	
2	THE VD HAD AN MT INDICATION RADIATING FROM THE VD'S WELD @11:00 DOWN THE MEMBER. THIS MEMBER WAS NOT COMPLETELY FLOODED TO THE TOP INFERRING THAT THIS INDICATION MAY NOT BE THROUGH WALL.	

FINAL EVALUATION

Final Evaluation :

MAGNETIC PARTICLE INSPECTION REPORT

Client's Ref. Number : **88967-312**

File # HWPWIN60\WP\DOCS\MTST130Q.WK4

Edwards

OI Job Number : **15855**

OI Inspection Number : **93/071**

Date : **11/18/93**

Form Number **MT- ST130Q #1**

Reference Form Number :

Page : **1** of **1**

GENERAL INFORMATION

Client : PMB/BECHTEL	Contractor : OCEANEERING INT.	Cert.
Client's Representative : F. PUSKAR	Underwater Inspector : B. TORLINE	MT-II
Structure ID : ST-130Q CHEVRON	Topside Inspector : K. EDWARDS	MT-III
Joint/Weld ID : VD MP A1/A2 -100' TO A2 -130'	Diving Supervisor : K. EDWARDS	

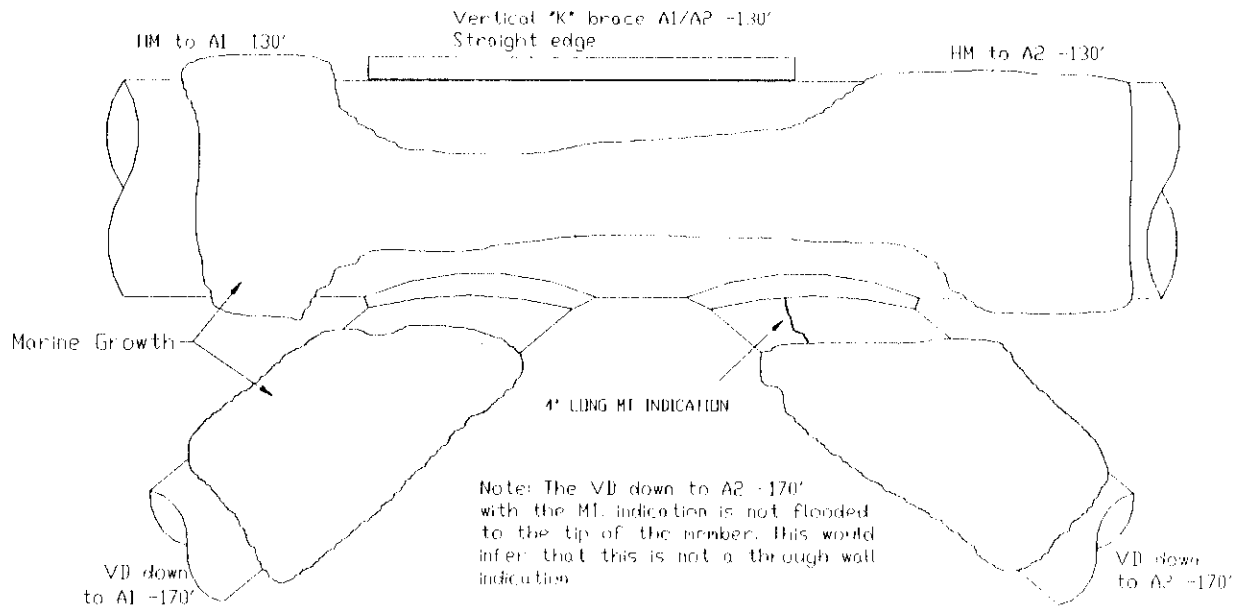
VISUAL INSPECTION RESULTS

Visual Indication : Y (Yes)(No)	Indication Location Weld : B Tow Haz Bead B Brace Chord
Clock Position : 11 To 11	Est. Width : > (>)(<) Hairline <OR>
Visual Length : 4"	Visual Width : 1/64"
Visual Material Separation : N (Yes)(No)	Visual Depth : NA

MAGNETIC PARTICLE INSPECTION RESULTS

MT Indication : Y (Yes)(No)	MT Indication ID Number : VD MP A1/A2 -100' TO A2 -130'
Clock Position : 11 To 11	Indication's Location Weld : B Tow Haz Bead B Brace Chord
MT Length : 4 Inches (Meas.) (Est.)	Orientation : T Longitudinal Transverse Both
Particle Build-up : H Heavy Moderate Light	Confirmatory Grinding : N (Yes)(No)
Particle Adhesion : S Strong Moderate Weak	Re-Test Indication : N (Yes)(No)
Depth Estimate on Particle Appearance : <1/16 < or > 1/16"	Remedial Grinding : N (Yes)(No)

DRAWINGS AND NOTES



Signature U/W Inspector : *B. Torline*

Signature T/S Inspector : *K. Edwards*

FINAL EVALUATION

Final Evaluation : A TRANSVERSE INDICATION STARTING AT 11:00 IN THE HAZ RADIATING DOWN THE MEMBER
THIS MEMBER WAS NOT COMPLETELY FLOODED INFERRING THAT THE INDICATION WAS NOT THROUGH WALL

DOCUMENTATION

Photo's Roll Number : Roll #6, Frame #19,20,21

VISUAL INSPECTION TECHNIQUE

Visual Inspection Technique : **See Visual Inspection Procedure Sheet OI**

©Edwards

Light Source : **Snooperette 30 Volts, 80 Watts**

Surface Preparation : **OCEANCLEANED**

Physical Measuring Tools : **Pit Gauge, Tape Measure**

Surface Condition : **BM Black Oxide Bare Metal**

MAGNETIC INSPECTION TECHNIQUE

Magnetic Particle Inspection Technique : **See MT Inspection Procedure Sheet OI**

Acceptance Standards : **As Per OI**

YOKE

Yoke Type : **Electromagnetic Articulating 110 VAC (Parker)**

Yoke Field Strength Calibration : **10 lb. Steel Flat Plate**

SURFACE PREPARATIONS METHOD

PARTICLES

Particle Type : **Mi-Glow #1 (Circle Chemical Co.)**

Surface Preparation : **Oceancleaned**

Particle Concentration Indicator : **Pic Type**

Surface Condition : **BM Black Oxide Bare Metal**

Particle Delivery System : **10 oz. Squeeze Bottles**

TESTING METHOD

LIGHT SOURCE

Light Source : **Birns Snooperette**

Magnetic Field : **AC Continuous, Flux Path Field**

Yoke Coverage : **Longitudinal, 2 inch Movements**

Light Intensity : **30 Volts, 80 Watts > 200 ft. Candles**

Magnetic Field Strength : **> 30 Oe**

CONFIRMATORY GRINDING TECHNIQUE (NOT USED IN THIS INSPECTION)

Grinding Burr Diameter : **0.5** *Minimum Diameter 1/2"*

The objective of confirmatory grinding is to remove or attempt to remove indications of known crack-like defects. Grinding shall be carried out using appropriate burs with a minimum diameter of 1/2" and shall be orientated such that the score marks are approximately at right angles to the weld's toe. The maximum total depth of grinding shall be limited to 1/16". Grinding shall be carried out in a series of passes. The maximum depth of grinding in any one pass shall be limited to 1/32". After each pass, MT inspection shall be carried out. The grinding sequence will continue until either the indications disappear or the maximum grinding depth is reached.

Confirmatory grinding requires client's prior approval.

Consolidated MT Inspection Report

ST 130 QTRS

Member ID	MT Defect	MT Form #	Photo	Description
MP A2/B2 -10' VD down to A2 -35'	N	None	Roll #5 8/11	No MT, FMD or VT indication
MP A2/B2 -10' VD down to B2 -35'	N	None	Roll #5 4/7	No MT, FMD or VT indication
MP A2/B2 -35' VD down to A2 -63'	N	None	Roll #5 18/21	No MT, FMD or VT indication
MP A2/B2 -35' VD down to B2 -63'	N	None	Roll #5 23/26	No MT, FMD or VT indication
VD A1 -170' up to MP A1/A2 -130'	N	None	Roll #6 3/6	No MT or VT indication Member is flooded
HM from A1 Leg -170' to VD up to MP A1/A2 -130'	N	None	Roll #6 7/8	No MT or VT indication VD is flooded
MP A1/A2 -130' VD down to A1 -170'	N	None	Roll #6 11/14	No MT or VT indication Member is flooded
MP A1/A2 -130' VD down to A2 -170'	Y	ST130Q	Roll #6 15/18	MT indication 11:00 at HAZ radiating down member into marine growth.

Photo Log	Inspection No. : 93/071	Date 11/18/93
Roll # 5	Structure : Chevron's ST 130 QTRS	Job No. 15855
Frame #	Description	
4	VD MP A2/B2 HM -10' DOWN TO B2 -35' 09:00	
5	VD MP A2/B2 HM -10' DOWN TO B2 -35' 12:00	
6	VD MP A2/B2 HM -10' DOWN TO B2 -35' 06:00	
7	VD MP A2/B2 HM -10' DOWN TO B2 -35' 03:00	
8	VD MP A2/B2 HM -10' DOWN TO A2 -35' 12:00	
9	VD MP A2/B2 HM -10' DOWN TO A2 -35' 09:00	
10	VD MP A2/B2 HM -10' DOWN TO A2 -35' 03:00	
11	VD MP A2/B2 HM -10' DOWN TO A2 -35' 06:00	
12	"K" BRACE A2/B2 -10' OUTBOARD	
13	"K" BRACE A2/B2 -10' OUTBOARD	
14	"K" BRACE A2/B2 -10' INBOARD	
15	"K" BRACE A2/B2 -10' INBOARD	
16	HM A2/B2 -10' TOP OF "K" BRACE TOWARDS B2	
17	VIEW OF MT MAGNET ON TOP OF HM A2/B2 -10'	
18	VD MP A2/B2 HM -35' DOWN TO A2 -63' 12:00	
19	VD MP A2/B2 HM -35' DOWN TO A2 -63' 09:00	
20	VD MP A2/B2 HM -35' DOWN TO A2 -63' 03:00	
21	VD MP A2/B2 HM -35' DOWN TO A2 -63' 06:00	
23	VD MP A2/B2 HM -35' DOWN TO B2 -63' 09:00	
24	VD MP A2/B2 HM -35' DOWN TO B2 -63' 05:00	
25	VD MP A2/B2 HM -35' DOWN TO B2 -63' 03:00	
26	VD MP A2/B2 HM -35' DOWN TO B2 -63' 06:00	
27	"K" BRACE A2/B2 -35' OUTBOARD	
28	"K" BRACE A2/B2 -35' OUTBOARD	
29	"K" BRACE A2/B2 -35' INBOARD	
30	"K" BRACE A2/B2 -35' INBOARD	
31	A2/B2 -35 HM WITH STRAIGHT EDGE	

Photo Log	Inspection No. : 93/071	Date 11/18/93
Roll # 6	Structure : Chevron's ST 130 QTRS	Job No. 15855
Frame #	Description	
3	A1 -170' VD UP TO MP A1/A2 -130' COMMON WELD OF VD AND HD 06:00	
4	A1 -170' VD UP TO MP A1/A2 -130' COMMON WELD OF VD AND HD 08:00	
5	A1 -170' VD UP TO MP A1/A2 -130' 09:00	
6	A1 -170' VD UP TO MP A1/A2 -130' 03:00	
7	HM FROM A1 LEG TO VD A1 -170' INBOARD SIDE (ANODE BRACE)	
8	HM FROM A1 LEG TO VD A1 -170' OUTBOARD SIDE (ANODE BRACE)	
9	"K" BRACE A1/A2 -130' INBOARD	
10	"K" BRACE A1/A2 -130' OUTBOARD	
11	VD MP -130' A1/A2 HM DOWN TO A1 -170' 09:00	
12	VD MP -130' A1/A2 HM DOWN TO A1 -170' 06:00	
13	VD MP -130' A1/A2 HM DOWN TO A1 -170' 03:00	
14	VD MP -130' A1/A2 HM DOWN TO A1 -170' 12:00	
15	VD MP -130' A1/A2 HM DOWN TO A2 -170' 06:00	
16	VD MP -130' A1/A2 HM DOWN TO A2 -170' 03:00	
17	VD MP -130' A1/A2 HM DOWN TO A2 -170' 12:00	
18	VD MP -130' A1/A2 HM DOWN TO A2 -170' 09:00	
19	VD MP -130' A1/A2 HM DOWN TO A2 -170' 11:00 SHOWING MT INDICATION	
21	VD MP -130' A1/A2 HM DOWN TO A2 -170' 11:00 SHOWING MT INDICATION AFTER MT INSPECTION	
22	VD MP -130' A1/A2 HM DOWN TO A2 -170' 11:00 SHOWING MT INDICATION AFTER MT INSPECTION	
23	"K" BRACE A2/B2 -130' INBOARD	
24	"K" BRACE A2/B2 -130' OUTBOARD	

4 Problems Encountered

A. Due to the time of the year, the weather forecast was inconsistent in determining an optimal weather window.

B. The extensive total bottom area covered by the toppled structure ST-130 A prevented the divers from reaching all interested areas.

5 Recommendations

A. Select a more desirable weather time frame part of year.

B. For further investigation of the toppled structure ST-130 A, use a four point mooring vessel. This will allow the dive boat to move about its anchor spread to facilitate the diver in reaching all areas of interest.

Appendices A
Equipment/Personnel Requirements

Equipment/Personnel Requirements

Personnel

- 1 Non-Diving Supervisor
- 2 Divers
- 2 NDT Divers
- 4 Tenders
- 1 Data Recorder

- 1 Surveyor

Equipment Diving

- 2 Decompression chambers
- 1 Compressor 90 cfm
- 2 Compressors 120 cfm
- 2 Volume tanks
- 3 Air filter systems
- 1 Air manifold control system
- 2 Dive hoses, 600'
- 4 Radios, air communication
- 2 Emergency ascent bottles
- 1 Deck connect ladder
- 1 Equipment box containing standard Oceaneering diving gear
- 1 Set standard intermediate decompression tables
- 1 Set full service technical manuals
- 1 OSHA first aid kit
- 1 Inspection box
- 1 Oceanclean grit cleaning system
- 1 750 cfm Oceanclean compressor
- 2 35mm underwater camera
- 1 MT Inspection gear with 500' cable
- 2 FMD instruments with 500' cable
- 2 Aerotech .5 x 1" square transducers

Survey Equipment

- 1 MesoTech Sector Scanning Sonar

Dive Vessel

- 1 120' long diving vessel

Consumables

- 2 Pallets of blasting sand
- 6 Roll 35mm film
- 1 Video tape VHS

Appendices B

Job Log

OCEANEERING INTERNATIONAL
Gulf Coast Division

JOB LOG

Job Report for : PMB Engineering

Location: South Timbalier 130-A

Job Number : 15855

Diver-in-Charge: Kenneth Edwards

Date	Time	Description
11/09/93		Mob equipment at shop.
11/10/93		Mob equipment to boat. Set equipment up on M/V Mr. Cliff. Travel from Morgan City to Fourchon, John W. Stone dock.
11/11/93	0300	On board M/V Mr. Cliff. Onway to ST-130A.
	0700	Tending crew up and helping set up survey equipment and dive station.
	0800	Dive crew up. Having meeting with job supervisor about scope of work.
	0900	Set first buoy at location. Dropped sonar to locate structure. Moved sonar closer to get contact of structure. Set other buoy to make first dive.
	1053	Diver #1 in water to locate and tie-off buoy to structure.
	1145	Diver #1 R/S. Buoy on structure at leg D1 @ -33'.
	1218	Diver #2 in water to attach 2 1/2" nylon line to structure to secure boat.
	1335	Line secured to C1 @ -33' elevation. Diver R/S.
	1407	Diver #3 in water to start video inspection of "K" and "X" bracing.
	1521	Diver #3 R/S water. One side elevation inspected. Had trouble getting video camera to leg D1 at -144'. Left camera tied to leg D1 @ -33' elevation.
	1545	Diver #4 in water to video bottom section of structure. Unable to get to leg D1 at bottom. Did inspection of leg D2 at bottom. Pile appears not be pulled at this leg.
	1657	Diver #4 R/S water.
	1708	Diver #5 in water to take photos of each leg of toppled section and release boat from structure.
	1801	Diver #5 R/S water. Photos taken. Boat unsecured.
	1859	Diver #5 R/S chamber.
	1920	Informed by J. Couch that crew would be going

OCEANEERING INTERNATIONAL
Gulf Coast Division

JOB LOG

Job Report for : PMB Engineering

Location: South Timbalier 130-A

Job Number : 15855

Diver-in-Charge: Kenneth Edwards

in for weather delay Friday. Should be back
in field on Saturday.

2059 Diver #5 ends chamber stand-by.

11/12/93 Vessel standing by at Fourchon's dock.

11/13/93 Vessel standing by at Fourchon's dock.

11/14/93 Vessel standing by at Fourchon's dock.

11/15/93 Vessel standing by at Fourchon's dock.

2200 Crew leave Morgan City shop, travel to
Fourchon's dock.

11/16/93 0600 Crew up. Setting up dive station.

0748 Diver #6 in water to start FMD inspection of
ST-151 A. Wind and waves prevent boat from
laying alongside structure. Hanging off of
stern of boat.

0855 Diver #6 R/S water.

0923 Diver #7 in water to start Oceancleaning
selected nodes. Oceanclean hose blow out
under dive shack. Checking out Oceancleaning
system. Corrected broken and inaccurate
pressure gauges.

1016 Diver #7 R/S water. Diver waiting on
Oceanclean system.

1018 Diver #6 R/S chamber.

1035 Diver #8 in water to Oceanclean C2/D2 "K"
brace at -23'.

1218 Diver #8 R/S water.

1232 Diver #9 in water to free Oceanclean hose.
Will be moving boat alongside structure. Wind
and seas died down.

1236 Diver #9 R/S water.

1313 Boat alongside structure. Diver #10 in water
to Oceanclean C2 -65' node.

1455 Diver #11 in water to do FMD inspection.

1548 Diver #10 R/S chamber.

1609 Diver #11 R/S water.

1632 Diver #12 in water to MT inspect and take
photos of clean nodes.

1722 Diver #11 R/S chamber.

1801 Diver #12 R/S water.

1910 Diver #12 R/S chamber.

OCEANEERING INTERNATIONAL
Gulf Coast Division

JOB LOG

Job Report for : PMB Engineering

Location: South Timbalier 130-A

Job Number : 15855

Diver-in-Charge: Kenneth Edwards

11/17/93	0729	Diver #13 in water to do FMD inspection at the -26' elevation.
	0841	Diver #13 R/S water. Picked diver up because of pending rough weather.
	0911	Diver #14 in water to do FMD inspection of bottom elevations.
	1009	Diver #14 R/S water.
	1036	Diver #15 in water to Oceanclean @ C1 node -134'.
	1117	Diver #14 R/S chamber.
	1122	Diver #15 R/S water.
	1149	Diver #16 in water to Oceanclean A2/B1 HM @ -64'.
	1220	Diver #15 R/S chamber.
	1313	Diver #16 R/S water.
	1333	Diver #17 in water to do MT inspection @ A1/B1 -64' "K" brace and C1/D1 -134' VD.
	1421	Diver #16 R/S chamber.
	1436	Diver #17 R/S water.
	1507	Diver #18 in water to do MT inspection @ A2 VD up to B2 -134'.
	1539	Diver #17 R/S chamber.
	1607	Diver #18 R/S chamber.
11/18/93	0638	Diver #19 in water to do FMD inspection from the -130' elevation up.
	0724	Diver #19 R/S water.
	0744	Diver #20 in water to Oceanclean @ A2/B2 "K" brace -130' and A1/A2 "K" brace -130'.
	0827	Diver #19 R/S chamber.
	0846	Diver #20 R/S water.
	0858	Diver #21 in water to Oceanclean at -37' and -10' elevation "K" braces.
	0954	Diver #20 R/S chamber.
	1037	Diver #21 R/S water.
	1102	Diver #22 in water to MT inspect and take photos @ -35' and -10' elevations "K" brace.
	1207	Diver #22 R/S water.
	1232	Diver #23 in water to do FMD inspection @ -130' and below elevation.
	1327	Diver #23 R/S water.

OCEANEERING INTERNATIONAL
Gulf Coast Division

JOB LOG

Job Report for : PMB Engineering

Location: South Timbalier 130-A

Job Number : 15855

Diver-in-Charge: Kenneth Edwards

1349 Diver #24 in water to Oceanclean -170' VD
from A1 to A2 leg.

1440 Diver #23 R/S chamber.
1455 Diver #24 R/S water.
1509 Diver #25 in water to MT inspect @ -170' A1
VD and -130' A1/A2 "K" brace.
1559 Diver #25 R/S water.
1608 Diver #24 R/S chamber.
1625 Diver #26 in water to take photos of @ -170'
A1 VD up to MP A1/A2 -130' elevation. Also
take photos of "K" A1/A2 -130'.

1712 Diver #25 R/S chamber.
1728 Diver #25 R/S water.
1800 Boat onway to Fourchon's dock.
1841 Diver #25 R/S chamber.
2100 Boat at Fourchon's dock.

Appendices C
Diving Statistics

Diving Statistics

Chevron ST-130 A			
	Estimated	Actual	Difference
Dives	6	5	-1
Depth Charges	842	953	111
Hours at Site	17	14	-3

Chevron ST-151 K			
	Estimated	Actual	Difference
Dives	6	13	8
Depth Charges	797	1476	709
Hours at Site	17	26	9

Chevron ST-130 QTRS			
	Estimated	Actual	Difference
Dives	11	8	-3
Depth Charges	2076	1542	-534
Hours at Site	21	14	-7

Aggregate Statistics			
	Estimated	Actual	Difference
Dives	23	26	3
Depth Charges	3715	3971	256
Hours at Site	55	54	-1

Appendices D
Abbreviations

List of Abbreviations Applied

Structural Members

1. HM . Horizontal Member
2. HD . Horizontal Diagonal
3. VD . Vertical Diagonal
4. VT . Vertical Member
5. CB . Conductor Bay Framing
6. A1 . Leg A1

Leg or Node Designations

1. A1 . Leg A1
2. "K" . "K" brace
3. "X" . "X" brace
4. MP . Mid Point of any member
5. / . "/" implies "to"; Example HM A1/B1 -130'
Horizontal Member from Leg A1 to Leg B1 -130'

Inspection Types

1. MT . Magnetic Particle Inspection
2. FMD . Flooded Member Inspection
3. VT . Visual Inspection

Photo Identification

1. HM A1/B1 -130'. . . . A1 to B1 -130' Horizontal Member
2. VD A1 -170' up to MP A1/A2 -130'