



HC PROJECT TITLE:

**CONSTRUCTION  
TRACEABILITY /  
WELDMAPPING / STRUCTURE  
CAD DATABASE PROGRAM FOR  
OFFSHORE & FPSO QA/QC.**

Description:

Implemented a Construction / Fabrication Quality Control and Assurance database program (network version) for major shipyards that are engaged in large offshore and marine projects where QA/QC forms part of the requirement and document submittals.

Pull items:

This QC/QA program proven reliable, user friendly (in fact must be very friendly as will be used by shipyard's staff) and competitively priced.

TOMTEC EXACO (S) (an ISO 9002 certified company) has studied numerous shipyards on their Quality Assurance programs that basically can be lined up onto verification and control of these areas:



1. Non-destructive testing conducted on the vessels.
2. Destructive testing and verifications.
3. Liaison with Classification Societies at both the field and engineering level.
4. Liaison with Owner's Representative at the field level.
5. Qualifications of welders.
6. Traceability of welders to structure of repairs and or new construction.
7. Documentation of all Quality records.
8. Traceability of structural cutting plans and steel mill certificates.
9. Documentation of drawing files.
10. Summarizing QC/QA report for client's auditors.

Currently, these Quality related activities are being conducted by the QC/QA department where specific QA engineers are assigned to specific projects/ships.

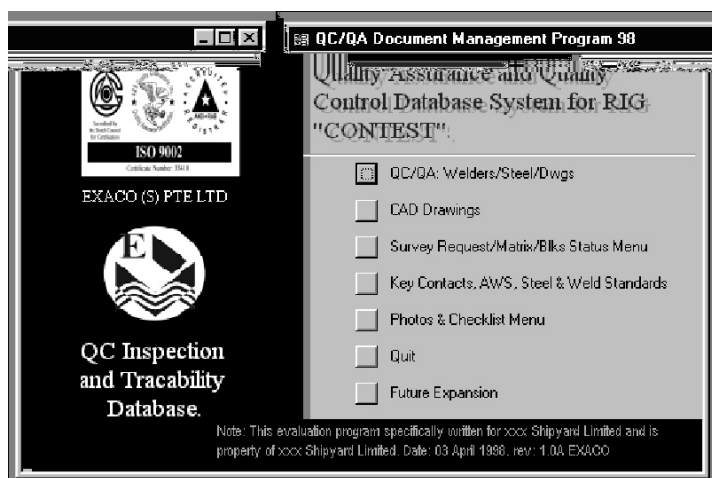
MARINE QUALITY ASSURANCE DATABASE  
by: TOMTEC EXACO (S) PTE LTD  
Project 532  
Client Ref: 2001-7810

While daily planning allows these QA/QC engineers to prepare various hardcopies



requisition forms for Owner's Representative (Superintendent), Classification Surveyors and Contractors a day or two before hand, the dynamic changes of events and large facility (compound of a shipyard) always make it unproductive in carrying many papers around (particularly onboard).

Also, project QC/QA is not solely undertaken by a single person and in general, always a team effort with all involved channeling to the success of the project.



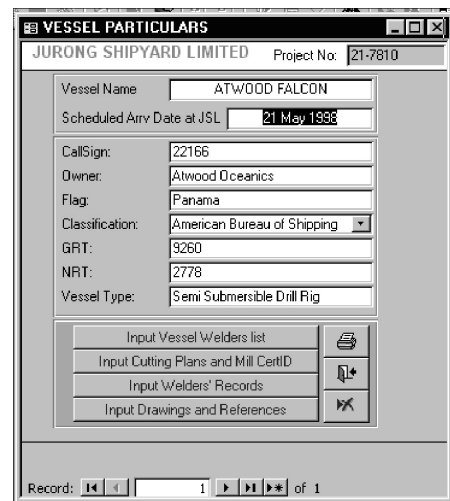
TOMTEC-EXACO has since implemented such a system (in Windows 95/98 environment) for a specific Oil Rig project. This project is still ongoing with two QC inspectors assigned to daily check and updates all Quality records to satisfy the client and the shipyard's needs.

This QC/QA program captures all the information as listed above and more. The program provides screen display of summary of AWS D1.1 welding standards and various nomenclatures of welding terminology.

All Project members and contact numbers are listed within the program with auto-dial facility (i.e. with PC station linked to a modem phone, you could simply point to the person you wish to talk to and dial his number (htel, pager, etc) and speak to him).

Have you ever go through thick stack of design drawings to find what you really want? And more often unable to locate it as someone has since taken

it away? This QC/QA program allows you to flip through hundreds of design drawings in a thumbnail bitmap screen display with full description of the drawing. You could then print onto your printer on the spot!



### Welders' Traceability and Welding Procedures Used

There are different welder grades and capturing assigned welders to different areas of the pre-fabrication, post-fabrication and installation can be a huge task if not documented proper.

Our QC/QA program not only allows ease of inputting these data but similarly able to sort specific records of each and every welder together with the welding seam he welded.

Approved welding procedures are also listed and captured within the database for ease of tracking and lining them up on specific location used onboard the vessel.

## Cutting Plans and Mill Certificates

**MASTER LIST: WELDER'S RECORD**

Vessel Name: ATWOOD FALCON  
 Call Sign: 22186  
 Owner: Atwood Oceanics  
 Flag: Panama

Classification: American Bureau of Shipping  
 GRT: 9260  
 NRT: 2778  
 Vessel Type: Semi Submersible Drill Rig

Scheduled Arrival Date: 21 May 1998

**WELDER'S PARTICULARS**

Badge No.	NRIC Identification	Welder Name	Work No.	Class	Process	Filler	Position	Employment	Expiry Date	Remarks
4	A2127174	Foo Tong Siew		ABS	SMAW	E-7016-G		PCN	17-07-98	
9	K332714	Motzel Khan		ABS	SMAW	E-7016-G		PCN	11-12-98	
24	K158243	Abram Hossain		ABS	SMAW	E-7016-G		PCN	11-12-98	
25	G34095	As Adul Islam		ABS	SMAW	E-7016		PCN	17-07-98	
26	K141591	Mahabur Rahman		LRS	SMAW	E-7016-G		PCN	11-12-98	
36	6271201	Tung Sing Tai		ABS	SMAW	E-7016-G		PCN	18-11-97	
44	J461952	Efash Hossain		ABS	SMAW	E-7016-G,ET		PCN	11-12-98	
54	K0157308	Ngalang Anak Imbat		ABS	SMAW	E-7016-G		HRC Welds	22-03-98	
55	5895406	Lay Kum Heng		ABS	SMAW	E-7016-G,E-70		HRC Welds	25-07-98	
57	A1264076	Fong Fook Wan		ABS	SMAW	E-7016-G		HRC Welds	25-01-98	
60	K3962728	Meh Anik Unjat		ABS	SMAW	E-7016,ET		PCN	18-11-97	

Ensuring which plate and grade that were installed on various sections of the vessel is also key consideration particularly to both the Owner and Classification Society Surveyor.

QC/QA program updates these records in-line with the Mill Certificate approvals, size, thickness and any lamination checks conducted.

**AWS QUALIFICATION**

AWS Qualification-Plates & Pipes | AWS Qualification-Fillet Welds | Weld Legends

**Groove Plate Test Welds:**

- Position 1G (Flat): Test Plate Horizontal Plane and weld metal deposited from upper side.
- Position 2G (Horizontal): Test Plate Vertical Plane with groove horizontal.
- Position 3G (Vertical): Test Plate Vertical Plane and groove vertical.
- Position 4G (Overhead): Test Plate Horizontal Plane and weld metal deposited from under side.

**Groove Pipe Test Welds:**

- Position 1G (Pipe Horizontal Rotated): Test Pipe placed with its axis horizontal & groove vertical. Pipe is rotated during welding and weld metal is deposited from the upper side.
- Position 2G (Pipe Vertical): Test Pipe placed with its axis vertical & groove horizontal. Pipe is not rotated during welding.
- Position 5G (Pipe Horizontal Fixed): Test Pipe placed with its axis horizontal & groove vertical. Pipe is not rotated during welding.
- Position 6G (Pipe Inclined Fixed): Test Pipe shall be inclined at 45 deg with the horizontal. Pipe is not rotated during welding.
- Position 6GR [Test for complete joint penetration groove welds of tubular T-, Y-, and K-connections. The test pipe inclined at 45 deg with the horizontal. Pipe is not rotated during welding.

Source: AWS D1.1 - 1998

A summary then could be sorted which outlined how many high tensile grades, etc were used on board this vessel.

A PC screen shot allows understanding what are the grades used and what are the related properties.

The QC/QA program has been tailored to specifically meet the requirements of the shipyard along with the high demand from the Shipowners.

The ease of use along with networking capability has made this program an invaluable tool for our team of QC inspectors in finalizing the documentation for owner's auditor.

The cost saving in preparation of numerous photocopies of mill certificates, plotting of drawings, print and reprint of requisition forms for surveyors and owner's representative, time spent in travelling to various sections of the yard and auditor's documentation printing for this project will amount to more than S\$15,000.00. This is estimate for a short stay (less than 4 months) of a ship undergoing minor repair here in Singapore dockyard.

With the success implementation of this Shipyard QC/QA network program, EXACO look forward implementing this program to all major shipyards in this region and also the Computerized QC/QA program forms part of the Quotation submittals and tender bids from Shipyards here to our International Clients.

**MASTER LIST: CUTTING Plans and MILL Certificates**

Vessel Name: ATWOOD FALCON  
 Call Sign: 22186  
 Owner: Atwood Oceanics  
 Flag: Panama

Classification: American Bureau of Shipping  
 GRT: 9260  
 NRT: 2778  
 Vessel Type: Semi Submersible Drill Rig

Arrival Date: 21 May 1998

Steel Plates and Mill Certificates Identification:

Date	Size (L x B)	Thick (mm)	Steel Grade	Heat Number	Cutting Plan Ref.	Location/Remarks	Standards	Country
05-05-98	2200 x 9000	50	AAS	839162-1	CP/A432/98	HL-6,HL8		
05-04-98	2400 x 9000	16	A	8383	CP/A416/98	FFT-CHAN LOCKER FS		
06-04-98	2400 x 9000	14	A	8295-9888-02	CP/A459/98	B1-BOTTOM PLATE - A (PORT)	DNV	Ukraine
06-04-98	2400 x 9000	14	A	8295-9888-05	CP/A459/98	B1-BOTTOM PLATE - B (PORT)	DNV	Ukraine
06-04-98	2400 x 9000	14	A	8295-9884-13	CP/A461/98	B1-BOTTOM PLATE - C (PORT)	DNV	Ukraine
06-04-98	2400 x 9000	14	A	8295-9864-06	CP/A463/98	B1-BOTTOM PLATE - D (PORT)	DNV	Ukraine
06-04-98	2400 x 9000	14	A	8295-9887-03	CP/A466/98	B1-BOTTOM PLATE - A (STBD)	DNV	Ukraine
06-04-98	2400 x 9000	14	A	8295-9886-14	CP/A470/98	B1-BOTTOM PLATE - B (STBD)	DNV	Ukraine
06-04-98	2400 x 9000	14	A	8295-9886-11	CP/A468/98	B1-BOTTOM PL - D (STBD)	DNV	Ukraine
06-04-98	2400 x 9000	14	A	8295-9885-10	CP/A469/98	B1-BOTTOM PLATE - C (STBD)	DNV	Ukraine
07-04-98	2438 x 9144	12.7	A	164524-00000	CP/A470/98	B1-BURNING PORT - C (STBD) 10 F	ABS	Ukraine
07-04-98	2400 x 9000	14	A	8295-9886-05	CP/A471/98	B1A-SHELL PL - E (PORT)	DNV	Ukraine
07-04-98	2400 x 9000	14	A	8295-9886-10	CP/A472/98	B1-SHELL PLATE - B (PORT)	DNV	Ukraine

TOMTEC-EXACO

Project Div.

[www.post1.com/~exaco](http://www.post1.com/~exaco)

**VARIOUS OUTPUT FORMS OF QC/QA PROGRAM.**

W.P SPECIFICATION LIST FOR "ATWOOD FALCON" PROJECT									
Weld PID	MPS No	PQR No	Weld Process	Manual Auto	Weld Progress	Weld Position	Material Class	FillerClass	Qualified Range
1	6198-2	6198-10-1	SMAW	Manual	2F	Horizontal	ASTM A106 GR.B	D 4301	Unlimited
2	6198-3	6198-10-1	SMAW	Manual	3F	Vertical	ASTM A106 GR.B	D 4301	Unlimited
3	6198-4	6198-10-1	SMAW	Manual	4F	Overhead	ASTM A106 GR.B	D 4301	Unlimited
4	7088-01	7088-01-1	SMAW	Manual	2F	Horizontal	AS/AN	E 6027	Unlimited
5	FC-05	FC-05-5	FCAM	Semi-Auto	1G	Flat	GR, EH 36	E 711-1	Unlimited
6	6628-03-1	6628-03-2	SAW	Auto	1G	Flat	GR, AH 36	F7A6/EH14	4.0 to 12mm
7	6198-5	6198-5-1	SMAW	Manual	1G & 4G	Flat & OH	RS GR. A	D 4301	Unlimited
8	6198-6	6198-6-1	SMAW	Manual	2G	Horizontal	RS GR. A	D 4301	Unlimited
9	6198-7	6198-7-1	SMAW	Manual	3G	Vertical	RS GR. A	D 4301	Unlimited
10	7077-21	7077-21-1	SMAW	Manual	4G & 1G	Flat & OH	B6 4360 GR. 50D	E 7016	Unlimited
11	7077-18	7077-18-1	SMAW	Manual	3G	Vertical	GR, EH 36	E 7016	Unlimited
12	7077-17	7077-17-1	SMAW	Manual	2G	Horizontal	GR, EH 36	E 7016	Unlimited
13	FC-08	FC-08-08	FCAM	Semi-Auto	3G	Vertical	GR, EH 36	E 711-1	Unlimited
14	FC-07	FC-07-07	FCAM	Semi-Auto	3G	Vertical	GR, EH 36	E 711-1	Unlimited
	FC-06-06	FCAM	Semi-Auto	2G	Horizontal	GR, EH 36	E 711-1	Unlimited	
	FC-06-06	FCAM	Semi-Auto	2F	Horizontal	RS GR. A	E 711-1	Unlimited	

File Edit View Insert Format Records Tools Window Help

CAD Drawings - Compilation Programming by EXACO (S) Pte Ltd

CAD dwg No: 1556800 AutoCAD drawing

Rig's Drawing: Atwood Falcon

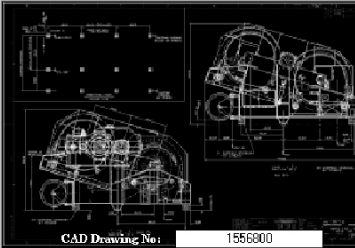
Description: Winch-Shipping & Installation outline

Number of Sheets: 2

Location: Sony CDR

Media: CDROM2

Originated: Amclyde



Input CAD Drawings

**INSPECTION FORM**

Serial No: HQA/7810/084

Date Applied: 05-Aug-98  
Date Required: 06-Aug-98

Location: On Board - Lower Hull  
QA/QC Inspector Name / Initial: Y.S. Chan \ QA Inspector

**Part B : To be completed by Owner / Class / QA/QC Inspector**  
Comments from Owner / Class / QA/QC Inspector:

**PART A : To be completed by QA / QC Inspector.**

Item No	Time Required	Inspect Items	Kind of Inspection
1	9:00 AM	Lower Hull - New Sponson - Tank 6,8 & 9 (P/S)	Air Test
2		Lower Hull - New Sponson - Tank 4,6,7,8 & 9 (P/S)	Final Inspection
3		Column Diaster PC 1A	Backgouging Inspection

Note: To be filled in the Final Report.

**MATERIALS FOR HULL CONSTRUCTION**

ABS Steel Grade for Construct of Hulls | High Tensile Steel | Material Class of Structures | Material Grades

Grade	Symbol	Thickness	Method of Decoxidation
A	AAM	<= 12.7mm	-
A	AAS	<= 12.7mm	-
A	AAK	<= 12.7mm	-
B	ABS	<= 25.4mm	Semi-Killed, Killed
B	ABK	<= 25.4mm	Semi-Killed, Killed
C	ACK	<= 50.8mm	Killed Fine Grain
C	ACN	34.9 - 50.8mm	Killed Fine Grain
CS	ACSN	<= 50.8mm	Killed Fine Grain
D	ADS	<= 34.9mm	Semi Killed or Killed
D	ADK	<= 34.9mm	Semi Killed or Killed
D	ADN	<= 34.9mm	Semi Killed or Killed
E	AEN	<= 50.8mm	Killed Fine Grain
R	ARS	<= 50.8mm	Semi Killed or Killed
R	ARK	<= 50.8mm	Semi Killed or Killed

Ultrasonic Examination of Plate Material: ASTM A435 Standard. Steel meeting the requirement are to have a letter "U" marked after the grade designation as a final letter. contact EXACO (S) Pte Ltd for details. Tel: 65-2800777 Fax: 65-2810777 eMail: exaco@post1.com

Source: CLASS RULE BOOK - 1998