

COMMENTS TO BE RETURNED TO:

COMPANY/PMC

FAX NO.:

FAX NO.:

BY DATE:

BY DATE:

Contractor Transmittal No.	T-DH-5578-E4-2541	Recd. Date	12 Jan 2011
Document No.	5578-E4-HSE-HU-00035	Rev. Date	11 Jan 2011
Document Title	Fall Prevention & Protection Procedure	Rev	0

COMMENTS:

By: _____ Signed _____ Date _____

Review Code:

- 1. REJECTED : REVISE AND SUBMIT
- 2. COMMENTS AS NOTED : WORK MAY PROCEED SUBJECT TO COMPLIANCE WITH AND INCORPORATION OF COMMENTS
- 3. NO COMMENTS : WORK MAY PROCEED
- 4. INFORMATION ONLY. : ACCEPTED FOR INFORMATION ONLY

No. of Pages attached to this form :

FALL PREVENTION & PROTECTION PROCEDURE

AGREEMENT NO. : 09-5578-E-4

PROJECT NAME : Ruwais Refinery Expansion Project
EPC-4: Tankage & Associated
Interconnecting Piping



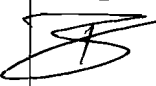

COMPANY : Abu Dhabi Oil Refining Company (TAKREER)

PMC : Mott MacDonald Ltd.

CONTRACTOR : Daewoo Engineering & Construction Co., Ltd.

TAKREER	RUWAIS REFINERY EXPANSION PROJECT	DAEWOO E&C	
	EPC-4 TANKAGE AND ASSOCIATED INTERCONNECTING PIPING		
	AGREEMENT No. 09-5578-E-4		
PROJECT No. 5578	Doc. No. 5578-E4-HSE-HU-00035	Rev. 0	Page 2 / 9

This page is a record of all revisions of this document. All previous issues are hereby superseded and are to be destroyed.

Proprietary Information: This document contains proprietary information and may not be partly or wholly reproduced without prior written permission from TAKREER and/or Daewoo Engineering & Construction Co., Ltd.							DOC. CLASS	T/1
							DIST. CODE	18/19
0	11 Jan 2011	Issued for Construction	A Mesquita	D Y Kim	V Bower	J. H. Lee		
B	11 Nov 2010	For Review & Approval	D. Bhandari	A. Mesquita	DY Kim	J.H. Lee		
A	16 August 10	For Review and Comment	C Wardman	DY Kim	J Brand	M Heo		
REV	DATE	REASON FOR ISSUE	PREP	CHKD	REVD	APP'D	COMPANY	
SIGNED (Initials)								

NOTES:

- (a) Revisions are denoted by a vertical line placed in the right-hand margin against the revised text.
- (b) PREP = Prepared by, CHKD = Checked by, REVD = Reviewed by, APP'D = Approved by.
- (c) In case of conflict between any requirements stipulated in this document with the contractual requirements, the contractual requirements shall prevail.

TAKREER	RUWAIS REFINERY EXPANSION PROJECT	DAEWOO E&C	
	EPC-4 TANKAGE AND ASSOCIATED INTERCONNECTING PIPING		
	AGREEMENT No. 09-5578-E-4		
PROJECT No. 5578	Doc. No. 5578-E4-HSE-HU-00035	Rev. 0	Page 4 / 9

CONTENTS

1.	INTRODUCTION	
	1.1 Purpose.....	5
	1.2 Objective.....	5
	1.3 Implementation.....	5
2.	RESPONSIBILITIES.....	5
	2.1 Project Manager.....	5
	2.2 HSE Manager.....	5
	2.3 Section Manager.....	5
3.	FALL PREVENTION / PROTECTION EQUIPMENT.....	6
	3.1 Safety Harness.....	6
	3.2 Positioning Belts.....	6
	3.3 Anchorage Points.....	6
	3.4 Safety Net.....	6
	3.5 Guardrails.....	7
	3.6 Handholds / Handrail.....	7
	3.7 Warning and Barrier.....	8
	3.8 Other Barriers (e.g. Hole Cover).....	8
4.	TRAINING AND ORIENTATION.....	8
5.	COMPLIANCE AND DISCIPLINARY.....	8
6.	PLANNING 100% TIE OFF.....	8
7.	TIE-OFF REQUIREMENTS.....	9
8.	PERSONNEL RESCUE.....	9

TAKREER	RUWAIS REFINERY EXPANSION PROJECT	DAEWOO E&C	
	EPC-4 TANKAGE AND ASSOCIATED INTERCONNECTING PIPING	AGREEMENT No. 09-5578-E-4	
PROJECT No. 5578	Doc. No. 5578-E4-HSE-HU-00035	Rev. 0	Page 5 / 9

1. INTRODUCTION

1.1 Purpose

This procedure is to establish minimum requirements and guidelines to provide maximum prevention and protection against falls from elevated areas. This HSE Procedure will apply to all activities carried out at height on the Ruwais Refinery Expansion Project.

1.2 Objective

No person shall be exposed to a potential fall hazard over 1.8 m high (or less when an impairment or other potential hazard exists) without protection provided by guardrails, nets or a tied-off safety harness shall be used in conjunction with approved tie-off systems. Wherever practical, work shall be planned and managed so as to eliminate work from heights. Where not practical, guardrails, scaffold platforms with standard handrails or aerial lifts shall be provided. Where these are not practical or adequate, or the hazards of erection are greater, a planned tie-off system shall be used, and the 100% tie-off policy implemented; i.e., a system of fall arrest devices shall be utilized during ascent, descent and during the work effort at elevated locations as indicated in this policy.

1.3 Implementation

Fall hazards are a common occurrence on most construction jobs, but especially where poor planning is allowed and enforcement is inadequate. CONTRACTOR shall comply with KOSHA or International standards and shall not be modified except by the Overseas HSE Team. This procedure will be implemented in on the Ruwais Refinery Expansion Project and will be reviewed regularly to measure its effectiveness.

2. RESPONSIBILITIES

2.1 Project Manager

- Has the final responsibility to ensuring that all personnel on the project shall comply with the requirements of fall protection as herein mentioned in this procedure.
- Shall take appropriate disciplinary action for the violators. As per the recommendation of the HSE Manager.

2.2 HSE Manager

- Should ensure that all personnel wear the required fall protection before they deployed to the jobs at height.
- Scheme and perform the HSE training for the personnel.
- Ensure that the inspection schedule of all fall protection equipment and procedure is being followed.

2.3 Section Managers

- Provide the required fall protection equipment for the personnel involved in working at height jobs.
- Apply for HSE training for personnel and ensure that the person attend the training.
- Ensure that only inspected fall protection equipment will be used at site.

TAKREER	RUWAIS REFINERY EXPANSION PROJECT	DAEWOO E&C	
	EPC-4 TANKAGE AND ASSOCIATED INTERCONNECTING PIPING		
	AGREEMENT No. 09-5578-E-4		
PROJECT No. 5578	Doc. No. 5578-E4-HSE-HU-00035	Rev. 0	Page 6 / 9

3. FALL PREVENTION / PROTECTION EQUIPMENT

3.1 Safety Harnesses

CONTRACTOR standard requires a full body harness with double lanyards to be used at site. A safety harness shall be approved by KOSHA or other International standards (CE or ANSI). Body belts are not allowed. Two side D-rings is needed for attachment to the sliding attachment point. Safety harness shock absorbing devices must be utilized as designed.

All safety harnesses shall be inspected periodically (quarterly) as per CONTRACTOR and Client requirements by competent person appointed by CONTRACTOR. Each employee must visually inspect his harness and lanyard prior to each use. A record will be maintained on the inspection and condition of all safety harnesses, lanyards and hardware. After passing inspection, each harness and lanyard will be color coded.

All harnesses and related equipment that have been subjected to shock loading or other obvious damage shall be destroyed and all others inspected as indicated above and, if suitable shall be returned to storage. At the end of the project, those harnesses and related equipment not meeting inspection criteria shall be destroyed.

3.2 Positioning Belts

Positioning belts shall not be allowed and its use is forbidden in any CONTRACTOR projects.

3.3 Anchorage Points

All tie-off points shall be at waist height or above. When conning a beam, it is permissible to tie off to that beam. All tie-off points and supports shall be capable of supporting a 2,500kg. Shock load per person attached. Lanyards shall be rigged as short as possible so as to minimize the potential fall distance, but at no time shall it exceed 1.8 m. The potential fall distance includes the effective length of the lanyard, plus the vertical distance from the tie-off point to the lanyard attachment point on the harness when the tie-off is below the harness "D" ring.

An anchorage point constructed onsite shall be capable of supporting 2,500kg per person;

- Wire rope perimeter cables, supports, clip, etc.
- Lifelines, retractable lifelines, ladder safety devices or rope grabs;
- Wire rope (horizontal lifeline-minimum 12mm) secured to other approved means
- Synthetic rope (vertical lifeline-16mm), steel beams
- Steel beams, 5 cm diameter pipe or larger
- Or especially attachment devices design/manufactured system.

All lifelines or anchorage points shall be inspected weekly by a competent person, and an inspection tag shall be provided for each anchorage points used as lifelines.

3.4 Safety Net

Safety nets shall be provided when workplaces are more than 7.5 meter above the ground or water surface, or other surfaces where the use of scaffolds, catch platforms, temporary floors, and safety lifelines is impractical.

TAKREER	RUWAIS REFINERY EXPANSION PROJECT EPC-4 TANKAGE AND ASSOCIATED INTERCONNECTING PIPING AGREEMENT No. 09-5578-E-4	DAEWOO E&C	
PROJECT No. 5578	Doc. No. 5578-E4-HSE-HU-00035	Rev. 0	Page 7 / 9

Where safety net protection is required by this part, operations shall not be undertaken until the net is in place and has been tested.

Nets shall extend 2.4 meter beyond the edge of the work surface where employees are exposed and shall be installed as close under the work surface as practical. Nets shall be hung with sufficient clearance to prevent user's contact with the surfaces or structures below. Such clearances shall be determined by impact load testing.

The mesh size of nets shall not exceed 150mm by 150mm. All new nets shall meet KOSHA or other International Standards (CE, ANSI) performance standards minimum impact resistance as determined and certified by the manufacturers, and shall bear a label of proof test. Edge ropes shall provide a minimum breaking strength of 2,500kg. Connections between net panels shall develop the full strength of the net and forged steel safety hooks or shackles shall be used to fasten the net to its supports.

Safety nets shall be provided when workplaces are more than 7.5 meter above the ground or water surface, or other surfaces where the use of scaffolds, catch platforms, temporary floors, and safety lifelines is impractical.

3.5 Guardrails

Guardrails and toe boards shall be provided at the outer edges and ends of all scaffolding from which a person could fall a distance of 1.8 m or more.

Top edge height of top rails, or equivalent guardrail system members, shall be 1.1 meter plus or minus 8 cm above the walking/working level.

Midrails, screens, mesh, intermediate vertical members, or equivalent intermediate structural members shall be installed between the top edge of the guardrail system and the walking/working surface when there is no wall or parapet wall at least 53 cm high.

Midrails, when used, shall be installed at a height midway between the top edge of the guardrail system and the walking/working level.

Guardrail systems shall be capable of withstanding, without failure, a force of at least 890 Newton applied within 5 cm of the top edge, in any outward or downward direction, at any point along the top edge.

Guardrail systems shall be so surfaced as to prevent injury to an employee from punctures or lacerations, and to prevent snagging of clothing.

Guardrail systems used on ramps and runways shall be erected along each unprotected side or edge.

Toe boards shall be provided at the lower side of edge to prevent loose materials from falling off the platform, it shall be constructed with tough materials such as scaffolding board with a minimum height of 15 cm.

3.6 Handholds / Handrail

Every stairway floor opening shall be guarded by a standard railing constructed in accordance with this procedure. The railing shall be provided on all exposed sides (except at entrance to stairway). For infrequently used stairways where traffic across the opening prevents the use of fixed standard railing (as when located in aisle spaces, etc.), the guard shall consist of a hinged floor opening cover of

TAKREER	RUWAIS REFINERY EXPANSION PROJECT EPC-4 TANKAGE AND ASSOCIATED INTERCONNECTING PIPING AGREEMENT No. 09-5578-E-4	DAEWOO E&C	
PROJECT No. 5578	Doc. No. 5578-E4-HSE-HU-00035	Rev. 0	Page 8 / 9

standard strength and construction and removable standard railings on all exposed sides (except at entrance to stairway).

Every ladder way floor opening or platform shall be guarded by a standard railing with standard toeboard on all exposed sides (except at entrance to opening).

3.7 Warning and Barriers

Warning signs and Barriers shall be erected prior to entry on an elevated open platform to warn employees that they are approaching an unprotected floor side or edge.

Warning signs and Barriers should be visible even during night time to warn personnel regarding the hazards.

3.8 Other Barriers (e.g. Hole Cover)

All openings in floors will be covered with temporary covers unless work is in progress which requires the opening. All temporary covers will be secured in place to prevent accidental displacement. Penetrations through flooring for permanent installations such as pipe or equipment must be protected through the use of temporary hole covers.

All temporary covers shall have the phrase “Hole Cover – Do Not Remove” marked on the face of the cover or if grating is used as a hole cover, it must be painted bright yellow.

All temporary hole covers must be capable of withstanding, without failure, a weight of at least 250kg. As a minimum 19 mm plywood or piece of scaffold board should be used to construct hole covers, where possible scaffold board should be used.

4. TRAINING AND ORIENTATION

Employees and supervision shall be trained in these requirements through the Scaffold Safety and HSE Induction training modules. Prior to the start of work, this will be reinforced in daily Toolbox Meetings (TBM), weekly Toolbox Talks and their performance frequently monitored by the supervisor and the HSE Department.

5. COMPLIANCE AND DISCIPLINARY POLICY

Compliance is mandatory for all project personnel, supervision and craft employees as well as subcontractors. Zero tolerance policy shall be applied (including instant dismissal) because of its critical consequences. The level of disciplinary actions may vary based on the projects requirements.

6. PLANNING FOR 100% TIE-OFF

Appropriate tie-off means must be planned and provided for where no positive protection is provided. This planning is addressed in the construction hazard analysis and pre-planning meetings and weekly progress meetings. An evaluation like JSA or Risk Assessment shall be conducted for each work area to identify those not adequately protected and employees shall not ascend to such areas unless appropriate fall protection equipment and tie-off means are made available.

TAKREER	RUWAIS REFINERY EXPANSION PROJECT EPC-4 TANKAGE AND ASSOCIATED INTERCONNECTING PIPING AGREEMENT No. 09-5578-E-4	DAEWOO E&C	
PROJECT No. 5578	Doc. No. 5578-E4-HSE-HU-00035	Rev. 0	Page 9 / 9

7. TIE-OFF REQUIREMENTS

Employees, subcontractors or other project personnel working in any elevated area shall wear a safety harness and must be tied-off to appropriate attachment means.

Height at which fall protection is required is 1.8 m from waist level to floor/ground unless additional hazards exist - unprotected rebar, hazardous equipment.

Tie-off is required on all temporary platforms. (E.g. Incomplete scaffolds, suspended scaffolds, ladders, manlifts, personnel baskets, JLG lifts). Tie-off is not required for completed scaffolds supported by the ground or other permanent floor, **except** as indicated below:

- When working from a ladder; when ascending or descending a temporary ladder over 6 meter high installed in a fixed position for over 4 hours and no cage or rest platform is provided.
- During scaffold erection/dismantling (tie-off to posts); working on incomplete scaffolds; ascending scaffolds over three frames or 6 meter high and no rest platforms installed (or where located so a fall can occur to the outside of perimeter protection).
- Personnel working at heights shall also hook up if the fall hazards are eminent such as working on the edge/side of guard rails
- Not properly inspected & clipped gratings
- As per discretion of the HSE Department

Lifelines, retractable lifelines, ladder safety devices or rope grabs shall be used to provide tie-off means where necessary.

Tie-off shall be anticipated when performing any of the following tasks and shall be provided:

- Ironworker connectors and bolt-up gangs;
- Pipe fitters erecting pipe in pipe racks, through large penetrations in grating/flooring, and welders not working from a suitable platform with guardrails
- Confined space entry work where egress-retrieval is restricted, or as required by OSHA or client.

Any other crafts or persons who work in locations where the nature of the work may require them to rely upon the harnesses as a fall arrest device, or where retrieval may be delayed for a significant time period if they do fall.

8. PERSONNEL RESCUE

When the use of fall arrest systems is required on a project, plans shall be made as to how persons may be retrieved in case of a fall arrested by a safety harness and adequate equipment provided on site.