Co-funded by the Erasmus+ Programme of the European Union

Learning Resources for the course:

Steel Structure Inspector Course for EN 1090

This document covers only:

Competence unit no. CU-3 DESIGN REVIEW

Table of Contents

Structure of this document:

Introduction.

Note. It is assumed that the teacher has in depth knowledge of the industry requirements for the topics discussed in this CU.

Reference document covering the course structure, see document D2.2
The content of this document covers deliverables for D4.1 and D4.2

If the teacher has altered the reference drawings in CU2, then it might be that additional student tasks could be added. As an example if the steel structure is abridge, then reference to official national requirements can be added. If it is housing in earth quake areas then additional requirements for that purpose should be added here.
Also an important factor can be if the reference company use a set of sub-suppliers or not. Topics related to that situation are relevant for implementation here.

Time schedule for CU 3: 6 hours (4 hours studying and 2 hours zoom meeting)

Please also note that the learning resources summarized and added in chapter C, is the deliverables harvested from 3 different pilot courses in Hungary and Sl

Objective.

The objective of this CU is to discuss the topic Design Review. What is the purpose of the Design Review? What structure should the design review have in the company and who is responsible for the design review and the follow up of this tasks.

In CU 3 we generally want to focus of the Inspectors role and responsibilities in a Design Review. Note that for a number of companies this topic will be completely new. Be aware of that students with industry background and experience may not know the topic and the consequences of the design review.

A. Teacher Guideline.

Content of the Teacher Guideline:

The topic for CU 3 is Design review.
A general focus should be why is the design review important, how shall the design review be carried out and who shall participate from your company in the design review process.

Based on the design review the following questions should be:

* Why do we want to carry out a design review?

* How shall we handle any findings in the design review?

* What are the consequences of the design review?

Additional relevant questions might be:

* What is the cost results of the design review?

It is important to stress that the design review should be carried out from a production point of view. This means that you should evaluate if you have the right equipment for producing the parts or if not, is it possible to modify the design in to suit your production equipment? How do you want to organize the fabrication process in steps? And so forth...

If the design review results in findings then it should be discussed how to follow up the findings. Should a design modification be submitted? Who should be responsible for such queries? These topics should be raised by you as the work proceed.

Discussions for student group work or for individual work if groups are not created:

Review the documents delivered for the inquiry.

*List minimum 3 areas/topics that needs to be evaluated in order to have a “fabrication friendly” design of a welded structure

*Verify the design from an inspection point of view. Should the design be accepted, or should the design be modified?

* what shall the inspector’s role be for this design?

Write a short report based on your findings.

* Deliver an inspection plan for the product in this course

* Create a findings report for the drawings delivered for this course

B. Students Guideline

CU 3 covers a topic that is very important in the company. It may happen that the design contains elements that might be difficult to produce or that may require additional training or purchase of new production equipment.
The purpose of the design review is to highlight any possible problems that can arise from the design.

If the design is not suitable for your production system, then a design review findings report should be released and an action plan for how to address this should be developed. Maybe a request for design modification might be the result of the work carried out. Or maybe new knowledge and competence must be planned for.

Where do you find information and learning materials etc.:
Under folder with “Resources and activities”. The material is available as pdf-files, word- and excel files, and video material (online at YouTube and as mp4 files stored in the learning management system). Please notice that the written assignments should be answered by using the word-files that are embedded into the description of the tasks. **You <u>shall not use</u>** the Office package installed on your own device.

Type of work:
You have 2 weeks to complete each CU. The first week should be preparation activities, while the second week should be used to solve the tasks, exercises and hand in your results to the teacher. The learning activities include *i*ndividual studies, work-based training in your company, group activities, classroom training and a digital Zoom video meeting with the teacher once per week (Saturdays) of using zoom meetings

C. Learning resources

Support resources from selected from the Internet.

Search in the Internet for these resources. Use document name and producer as reference.

Title	Producer	Language	No of pages	Copy-right
Design review Flow chart		English	1	No
Steelworks Supervision Guide	ACE, Singapore	English	78	No

Learning resources developed in the project. These learning resources are listed in the Appendix.

Contact the producer if more information is required.

Title	Producer	Language	No of pages	Copyright
Inspection and testing plan	ISIM	English	6	No
QA-13-2.2 Control and verification before welding	QMS	English	1	Yes
QA-13-4Control and verification after welding	QMS	English	1	Yes
QA-16 Procedure for Identification and traceability	QMS	English	1	Yes

Video resources created for this CU

No special resources have been created for this CU

D. Students tasks

Discussions for student groups or to be submitted as individual tasks for the students:

Review the documents delivered for the inquiry.

*List minimum 3 areas/topics that needs to be evaluated in order to have a “fabrication friendly” design of a welded structure

*Verify the design from an inspection point of view. Should the design be accepted, or should the design be modified?

* What shall the inspector’s role be for this design?

Deliver an inspection plan for the product in this course

Write a short report based on your findings.

* Deliver an inspection plan for the product in this course

* Create a finding report for the drawings delivered for this course

Discussions among the students/groups

Discussions topics for the students

If the control is related to the structure and the design, then a specification shall be written.

* Who is responsible for creating such a procedure ?

* Who shall write such a procedure?

* Shall the procedure be valid for a person or a group of persons ?

Tasks/Discussions for the students:

Review the documents delivered for the inquiry.

* List minimum 3 areas/topics that needs to be evaluated in order to have a “fabrication friendly” design of a welded structure

*Verify the design from an inspection point of view. Should the design be accepted, or should the design be modified?

* what shall the inspector’s role be for this design?

Discussions topics for the students

If the control is related to the structure and the design, then a specification shall be written.

* Who is responsible for creating such a procedure?

* Who shall write such a procedure?

* Shall the procedure be valid for a person or a group of persons?

E. Evaluation

1. Did you find this module relevant ?

* Yes
* No
* I don't know

2. Was it time enough for going through the material ?

* Yes

* No
* I do not know

3. Was the resources relevant for this module ?

* Yes
* No
* I do not know

F. Appendix.

Learning resources developed for this CU.

The list is according the table: Learning resources developed in the project. Se paragraph C-Learning Resources.

The learning resources for this CU have been scanned and merged together as one document.

INSPECTION AND TEST PLAN

REVISION	DATE	DESCRIPTION OF REVISION	ISSUED BY	CHECKED By	APPROVED BY
0		For Approval	HCE	Samer Abboud	Botros

Signatures - I have reviewed and approved this procedure:

CONTRACTOR	CLIENT	2nd PARTY	3rd PARTY

1. SCOPE OF WORK

This ITP for Carbon Steel pipeline, is prepared by **Sample Ltd**. (hereafter the CONTRACTOR) for the execution of [insert the name of the client] (hereafter the CLIENT) Project, [insert the name of the project] (hereafter the PROJECT)

Line	Diameter/WT/Material	Weld Numbering
Gas Line		SPL-Y-XXX

2. REFERENCES DOCUMENTS (last revision)

- ASME B31.3 Process piping
- IGEM UP/1 Strength testing, tightness testing and direct purging of industrial and commercial gas installations
- ASME IX Welding and brazing qualifications
- ASME V Nondestructive Examination
- EN10204 Metallic products- types of inspection documents
- Other relevant EN/ISO requirements
- The designer specifications and drawings

3. INSPECTION LEVELS & DEFINITIONS

M	MONITORING is meant that the representative of the designated ORGANISATION attended the Activity and/or personally satisfied himself that the correct Testing Procedure was followed and the utilised equipment was in proper working condition (Stamp+ Signature).
A	APPROVAL is defined as the Act of Approving the outcome of a certain Activity (Stamp+ Signature).
H	HOLD POINT defined in an appropriate document, beyond which an activity must not proceed without the Approval of the designated organisation or Authority. The Approval to proceed beyond a Hold Point is, usually, given in written form but it may be given by any other agreed system of authorization. (Stamp+ Signature).
R	REVIEW is defined as the Examination of Documentation in order to verify Completeness and Acceptability, according to Project Requirements.
W	WITNESS is meant that the representative of the designated organisation is phisically present during the action being witnessed.
N/A	Non Applicable

Activity Description	Reference Document	Acceptance Criteria	Quality Record	Contractor	2nd Party	3rd Party
Latest version of specifications and drawings - IFC	Contract Specifications and Drawings	All specifications and drawings received from the client that are stamped and approved for construction will be stamped by the Contractor	Issued For Construction (IFC) Drawings Register	H	R	R
Construction Procedures	The procedures	Procedures describing the execution of the works	Master Controlled Document List	H	R	R
NCR	Quality Management Plan	For any request issued by the Contractor asking the client to agree to changes of the methods of work described in the engineering plan, execution plan or the approved Procedures	Quality Management Plan Procedure and NCR Report	H	R/A	R/A
Deviation Request	Quality Management Plan	Non Conformance is considered as items or activities that do not conform to prescribed technical and/or quality requirements or deviate from the standards and specification	Quality Management Plan Procedure and Deviation Report	H	R/A	R/A
Receive & Inspect materials	Materials Handling Procedure	Inspect material during receipt for: • quantities • conformance to requirements • dimensional • damage • MTR - material test report	Material Receipt and Visual Inspection Report	H	R	R
Cutting a pipe	Pipe Log and Traceability Procedure	Pipe number and heat number to be transferred to both sections after pipe is cut. Heat number should be clearly marked on each stump	The procedure	H	M	M
Pipes and fittings tracking	Pipe Log and Traceability Procedure	Marking the pipes HN over pipes and fittings, After welding filling the welding book for tracking the materials	The procedure itself	H	R	R

Activity Description	Reference Document	Acceptance Criteria	Quality Record	Contractor	2nd Party	3rd Party
Flange Closing	Flange Closing Procedure	Closing in accordance with the approved procedure and to the required torque	Bolt Torque Closing Report	H	R	R
WPS/PQR	WPS Documents	According ASME 31.3 and ASME IX, Including Passing The Mechanical Tests And NDT	Approved WPS and PQR	H	W	W
Welders Qualifications	Welding Procedure	ASME IX and/or relevant EN/ISO requirements	Welder Certificate	H	W	W
Welding Electrodes	Welding Electrode Procedure	Manufacturer quality certificate report including mechanical & chemical parameters	Mechanical & Chemical test report	H	R	R
Weld Inspection	Welding Procedure	Welding inspection before/during/on completion of the welding process, welding parameters will be taken on daily basis one per day per each welder.	VT Weld Report	H	R	R
NDT	NDT procedures	NDT According to ASME B31.3/ ASME V or according to relevant EN/ISO requirements	Laboratory NDT Reports	H	R/A	R/A
Weld Repair	Welding Procedure	Repair According To WPS After Marking The Exact Location For Repairing / Add “R” to the weld Number Fill weld repair report including: repair reason, location and depth, welder ID, welding parameters.	Welding Book & Repair Weld Reports	H	R/H	R/H
Weld Cut Out	Welding Procedure	Cut and quarantine / Add “N” to the new weld Number	Welding Book & Weld Report	H	W	R

Activity Description	Reference Document	Acceptance Criteria	Quality Record	Contractor	2nd Party	3rd Party
Production Weld	IGID	Perform two specimens for tensile, two for root bend face and two for face bend test as per ASME B31.3 and/or relevant EN/ISO requirements	Laboratory report	H	W	W
Golden Welds (if applicable)	Welding Procedure	According To The Relevant Procedure. Add “GW” to the weld Number	Golden Weld Report	H	H	H
Welding Book	Welding Procedure	Record The Weld Data In The Welding Book File	Welding Book	H	R/A	R/A
Coating and wrapping	Joint Coating Procedure	Perform coating in accordance with the project specification, the coating procedure and manufactures instructions	Pipe Coating Report	H	R	R
Painting	Above Ground Painting Procedure	Perform painting in accordance with the project specification, the painting procedure and manufactures instructions	Above Ground Painting Report	H	R	R
Holiday inspection	Joint Coating Procedure	Perform holiday testing in accordance with the coating procedure and manufactures instructions. No holiday are allowed Holiday test entire joint including field weld. Repair any holidays and re-inspect by Holiday test.	Holiday Test Report	H	H	H
Trenching	Excavating Procedure	Trench profile in accordance with the procedure, drawings and in accordance with safety requirements	Coordination with all infrastructures and landowners/ Trenching report	H	R	-
Lifting and Lowering in	Lifting and Lowering in Procedure	Lifting Approval- Lifting plan Lowering Approval – check list to assure all pre-works have been completed successfully before lowering	Approval for Lifting and Lowering/ Lowering report	H	R	-

Activity Description	Reference Document	Acceptance Criteria	Quality Record	Contractor	2nd Party	3rd Party
Padding and Backfill	Backfilling procedure	Backfilling Approval – check list to assure all pre-works have been completed successfully before backfilling	Check list for Backfilling	H	R	-
Pressure Test procedure	Pressure Test Procedure	The "Pressure Test Procedure" must be signed by all the parties prior to commencement of the pressure test	The procedure itself	H	R/A	R/A
Measuring Equipment	Pressure Test Procedure	Show evidence of calibration and materials meet the project requirements	Certificates of facilities and materials	H	R	R
Check list for pressure test	Pressure Test Procedure	Assure pre works prior testing have been completed successfully.	Check list for pressure test	H	H	H
Cleaning	Cleaning Procedure	Inspection of cleaning of the line	Cleaning Report	H	R	R
Pressure Testing	Pressure Test Procedure	Pressure testing the lines according the procedure. Results shall meet ASME and/or relevant EN/ISO requirements	Pressure Test Report	H	W	W
As Made Documents		Issue As made documents and Drawings	As made documents	H	R/A	R/A

© QM Software	**CONTROL AND VERIFICATION BEFORE WELDING**	**Procedure No.:** 13.2.2 **Rev. no.:**
Project:	Order: Section:	Page: 1 of: 1

Target:	Welding Inspector, foremen
Purpose:	Ensure that inspection is carried out at relevant places before welding and that a relevant WPS has been selected for the task.
Scope:	The procedure covers welding related inspection before welding
Responsibility:	Welding Coordinator
Reference:	

	OK/ NOK	Not rel.	Date sign.
1. Verify that the WPS is according to: * material to be welded * selected welding process * filler material to be used * material dimensions * welding positions			
2. Verify that the welding preparation has been carried out according requirements and according WPS and standard: * surface treatment * bevel preparations* dimension of the bevel and tolerances			
3. Verify the assembly related to tolerances			
4. Verify that the correct tack welding procedure has been used			
5. Verify that a proposal for welding sequence is available, if required			
6. verify if there are any requirements for production tests			
7. Verify if any considerations for health, environment and safety has been made			
8. Check if the contract has other requirements that is not specified in the WPS			
9. Verify that the base material is according specification			
10. Verify that the marking of parts are according the requirements for identification and traceability in the contract.			
11. Verify that the filler material and aux. Material are according contract requirements			
12. Verify that the referred standards and contract requirements are known for the personnel that shall carry out the work			
13. Verify that the personnel have correct certificates			
14. Verify that the requirements in procedure 4.3.1 and 4.3.10 are fulfilled			
15. Check that the necessary requirements to ensure: accessibility for lifting of equipment and positioning			
16. Verify accessibility of protection equipment			
17. Verify that the following items have been considered: * energy loss in cables			

	* loss of flow in pipes * temperature for cooling media * distance between welding unit and primary outlet			
	18. Ensure that production samples can be made			

Created by:	Approved by:	Date:	Manual no.:

© QM Software	**CONTROL AND VERIFICATION AFTER WELDING**	**Procedure No.:** 13.4 **Rev. no.:**

Project:	Order:	Section:	Page: 1 of: 1

Target:	Welding Inspector, Control department
Purpose:	Ensure that inspection after welding is carried out according contract requirements
Scope:	The procedure covers welding related inspection after welding
Responsibility:	Welding Coordinator
Reference:	

	OK/ NOK	Not rel.	Date sign.
1. Visual control to be carried our according procedure XXX			
2. None-Destructive testing shall be carried out according procedure: * MPI/DPI procedure no: * RT procedure no: * UT procedure no:			
3. Destructive testing shall be carried out according procedure: * Tensile procedure no: * Bend test procedure no: * Impact procedure no: * CTOD procedure no:			
4. Dimensional control shall be performed according procedure no:			
5. Heat treatment after welding shall be performed according procedure no:			
6. Other treatment after welding to be performed according procedure no: * Grinding procedure no:			

Created by:	Approved by:	Date:	Manual no.:

© QM Software	**PROCEDURE FOR IDENTIFICATION AND TRACEABILITY**		**Procedure No.:** 16 **Rev. no.: 0**
Project:	Order:	Section:	Page: 1 of: 1

Target:	Production Manager
Purpose:	Ensure that identification and traceability is maintained through the production process
Scope:	The procedure is valid for the welding related activities
Responsibility:	Welding coordinator
Reference:	

	1. Activities for identification and traceability before start of production: * Availability of the production plan for the contract * Availability of control plan for the contract * List of equipment for the contract * list of WPS to be used for the contract	
	2. Get access to welding drawings with weld numbers	
	Activities in the production phase:	
	3 Material reception	List of material with visual control and reference to material certificates
	4. Cutting	Cutting list/plan and plan for marking of pieces
	5. Welding	Welding drawing Procedure for marking of parts Weld log for production WPS Welders certificates
	6. Control	Extent of control NDT-reports Non-conformance notices Repair requests Control log
	7. Final control after welding	Weld log

Created by:	Approved by:	Date:	Manual no.: