

the next generation of European Training for Manufacturing



Online tools for supporting training delivery

Session focused on some of the innovative tools developed to promote and support on-line/distance/blended learning

18th November 2020

10.45h – 11.30h CET

Event organised in the framework of the
57th Meeting of the EWF General Assembly



Online tools for supporting training delivery

Time	Topic	Moderated by
10h45	DIGIWELD Innovative digital tool for training in the field of Welding <ul style="list-style-type: none">– Overview of the Project– Educational material– LMS & SIMTRANET	Susana Nogueira Héctor Carballo (CESOL) Antonio F. Perez (ATS)
11h05	Tools to support training Other Projects	Francisco Barros



DIGIWELD

Innovative digital tool for training in the field of Welding

Session focused on DIGIWELD results and how they can foster online training and learning in Welding



DIGIWELD

Innovative digital tools for training in the field of welding

ONLINE TRAINING TOOLS TO SUPPORT TRAINING DELIVERY

SUSANA NOGUEIRA– Project Manager at EWF
HÉCTOR CARBALLO– Technical Department CESOL
ANTONIO FERNÁNDEZ - International Business Development at SEABERY



2018-1-RO01-KA202-049218

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



The Next Generation of European Training For Manufacturing
18th November 2020

1

OVERVIEW



- ☐ PARTNERSHIP
- ☐ SCOPE & MAIN PURPOSES
- ☐ IOS & ACTIVITIES

2

EDUCATIONAL MATERIAL



- ☐ DIGITAL COMPETENCES
- ☐ MMA
- ☐ GMAW
- ☐ TIG
- ☐ QUALITY ASSURANCE IN WELDING

3

LMS & SIMTRANET



- ☐ LMS
- ☐ SIMTRANET

1. | OVERVIEW - PARTNERSHIP



<http://www.digiweld.eu/>



Coordinated by:

ASR - Asociația de Sudură din România



In Partnership with:



CESOL - Asociación Española de Soldadura y Tecnologías de Unión



Colegiul Tehnic "Domnul Tudor"
Drobeta Turnu Severin



ISTITUTO ITALIANO
DELLA SALDATURA
Il Gruppo





European Council Communication

“Rethinking Education: Investing in skills for better socio-economic outcomes”

- ➔ Proposal for updating the European Welder Guideline (EWF-IAB-089r5-14):
 - **Inclusion of a new module “Introduction to Computer and Simulations”**
 - **Use of welding simulators on practical training, under specific conditions**
- ➔ Digital tool to be included on welding simulators as modules dedicated to training young trainees
- ➔ Open and innovative digital learning system (SIMTRANET) to boost the availability and quality of open and digital educational resources and pedagogies for VET, in the field of arc-welding technology

Modernization of teaching methods & Support for Learning



1. | OVERVIEW: IOS & ACTIVITIES



IO1 – New curricula of Guideline AB-089r5-14



IO2 – Digital learning materials for welding simulator

DIGIWELD Target-Groups:



IO3 – Digital practice modules, including real life study cases (for welding simulator)

- Teachers and trainers from VET schools and other non-formal education entities



IO4 – Elaboration of digital examination system

- Unemployed adults or people with fewer opportunities



IO5 – Elaboration of learning management system and set up SIMTRANET



- Workshops
- Collaborative workshops (Demonstrative activities & Contests)
- Webinars





Theoretical/practice contents

- Teaching guide/ syllabus
- Teaching units
- Practice units

Full contents



Multimedia presentations

- Animated Presentation + SME Voice-over

Brief overview



Evaluation

- Digital examination system
- Practice exercises on simulator

2. | EDUCATIONAL MATERIAL



DIGITAL COMPETENCES

- ✓ Understand how to use the digital tools
- ✓ Use and exploit the modules developed in LMS
- ✓ Know how welding simulators work

TRAINING DIGITAL TOOLS AND METHODOLOGY

Economical

Ecological

Safety

Educational

LEARNING MANAGEMENT SYSTEM



WELDING SIMULATORS



2. | EDUCATIONAL MATERIAL



MMA



01

INTRODUCTION

02

EQUIPMENT

03

WELDING
TECHNOLOGY

04

WELDING
PARAMETERS

05

ELECTRODES

06

WELDING POSITIONS

07

HEALTH AND SAFETY

01

INTRODUCTION

02

EQUIPMENT

03

WELDING
PARAMETERS

04

TRANSFER MODE

05

SHIELDING GAS

06

WIRES

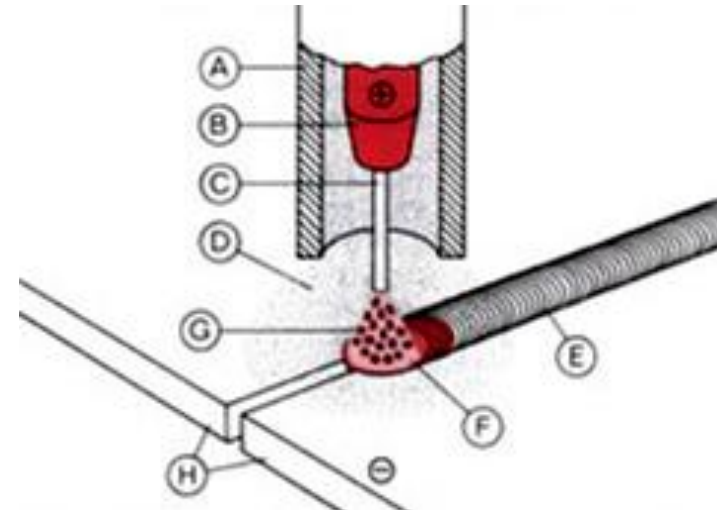
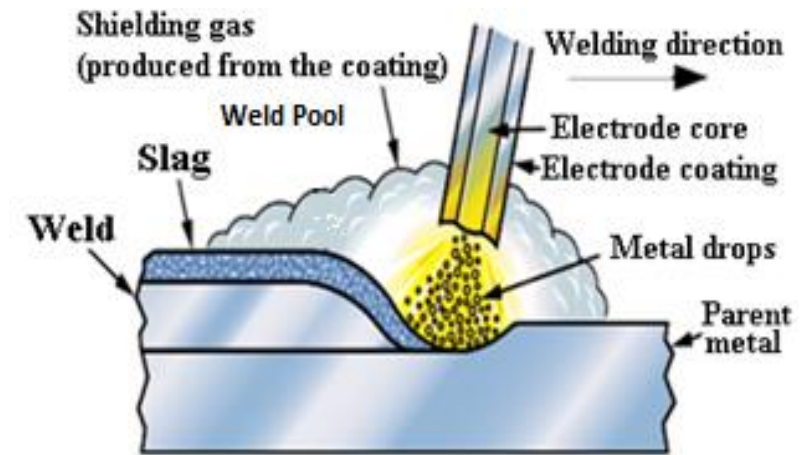
07

TECHNIQUE

08

TYPICAL DEFECTS

GMAW



2. | EDUCATIONAL MATERIAL



TIG



01

INTRODUCTION

02

EQUIPMENT

03

WELDING TECHNOLOGY

04

SHIELDING GAS

05

WELDING
PARAMETERS

06

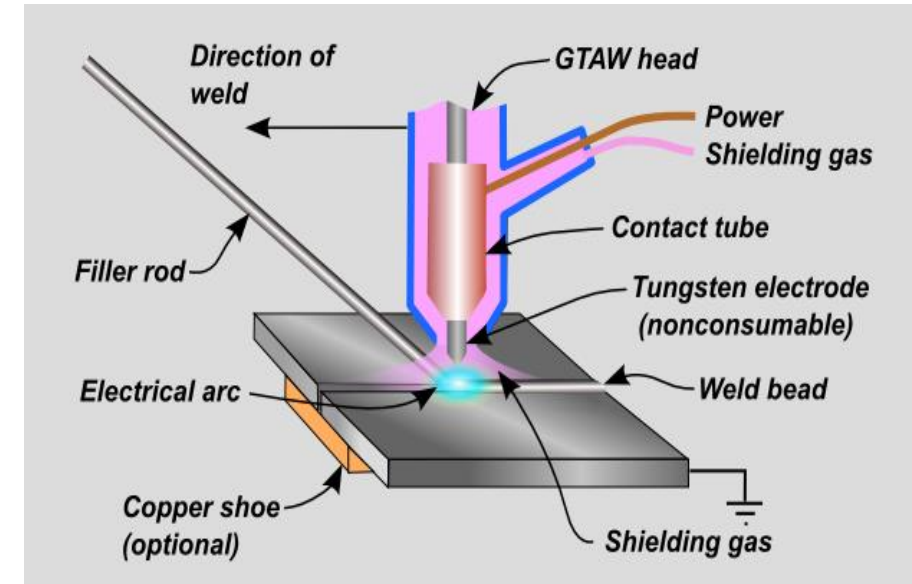
WELDING POSITIONS

07

TYPICAL DEFECTS

08

HEALTH AND SAFETY



Quality Assurance
in Welding



01

QUALITY IN WELDING

Describe and explain the role and operation of specific standards about quality in welding

02

WPS & WPQR

Describe and explain the role of Welding Procedure Specification and Welding Procedure Qualification Record for quality level.

03

WELDING
IMPERFECTIONS

Identify potential causes of welding defects or imperfections prior to welding, and take action to meet requirements

04

WELDER QUALIFICATION
AND INSPECTION

Inspect welded work-piece for defects and apply quality checks on process.



3. | LMS & SIMTRANET



SOLDAMATIC

- Practices modules & exams
- View theoretical contents:
 - Pdf



LEARNING MANAGEMENT SYSTEM (LMS)

- Built on Moodle (Free software)
- Theoretical contents:
 - Docs/Pdf
 - Videos
 - Tests





Thank You
For your attention

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18th November 2020



Tools to support training: Other Projects

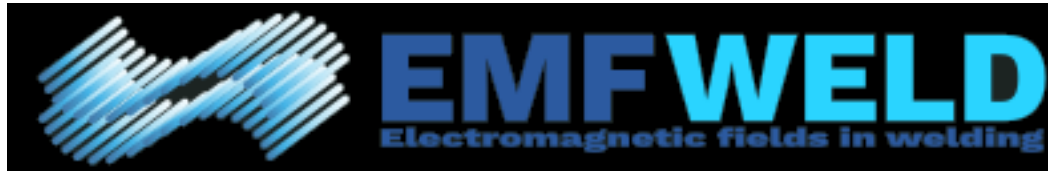
Session focused on presenting supporting tools for training, developed in other projects

by Francisco Barros



This project has received funding from the European Union Horizon 2020 research and innovation programme under grant agreement No 768775

Online Tools Supporting Education



EMFWELD



✓ Type of Tool

Online Assessment Tool



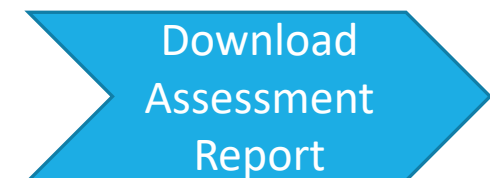
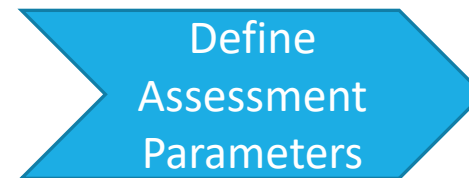
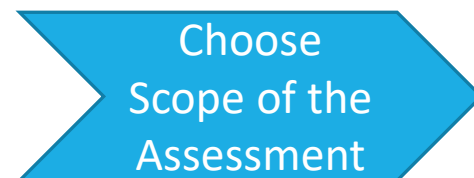
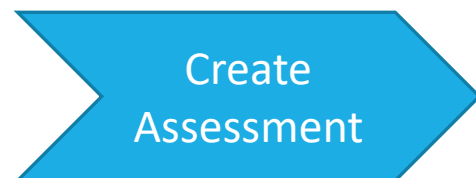
✓ Subject

Assessment Electromagnetic Field in Welding


✓ Link

<http://www.emfweld.eu/Default.aspx>

✓ Process/ Methodology













EMFWELD

 EMFWELD
Electromagnetic Fields in welding

MAIN MENU

Main Menu Options

Please select an action from the options below.

-  CREATE ASSESSMENT
-  HOW TO INTERPRET EMFWELD ASSESSMENT REPORTS
-  VIEW SAVED ASSESSMENT REPORTS
-  ACCOUNT SETTINGS
-  CHANGE PASSWORD
-  PURCHASE ASSESSMENT LICENCES
-  VIEW PURCHASE HISTORY
-  MESSAGES
-  ABOUT DIRECTIVE 2013/35/EU
-  DOWNLOAD AN EXAMPLE REPORT

[Logout](#)[Terms, conditions and privacy agreement](#)

EMFWELD | Scope of Assessment

CAPACITOR DISCHARGE STUD
INDUCTION HEATING
MAGNETIC PARTICLE INSPECTION (MPI) - TOROIDAL COILS
MAGNETIC PARTICLE INSPECTION (MPI) - YOKE
MANUAL METAL ARC (MMA) - ALTERNATING CURRENT (AC)
MANUAL METAL ARC (MMA) - DIRECT CURRENT (DC)
METAL INERT/ACTIVE GAS (MIG/MAG) - DIRECT CURRENT (DC)
METAL INERT/ACTIVE GAS (MIG/MAG) - PULSED CURRENT
RESISTANCE WELDING - MEDIUM FREQUENCY DIRECT CURRENT (DC)
RESISTANCE WELDING - SINGLE PHASE ALTERNATING CURRENT (AC)
SUBMERGED ARC WELDING (SAW) - ALTERNATING CURRENT (AC)
SUBMERGED ARC WELDING (SAW) - DIRECT CURRENT (DC)
TUNGSTEN INERT GAS (TIG) - ALTERNATING CURRENT (AC)
TUNGSTEN INERT GAS (TIG) - DIRECT CURRENT (DC), PLASMA
TUNGSTEN INERT GAS (TIG) - PULSED CURRENT

EMFWELD | Parameters and Results

Assessment Parameters

- Current Characteristics (RMS, Waveform)
- Cable Geometry
- Equipment and Assessment Information

Assessment Report

- Details
- Results (Action Levels of the Magnetic Field)
 - 3 levels (Low, High, Limb)
 - Exposure Limit Values
 - Action Level Map (top, side and front views)



HS-EMFW



✓ Type of Tool

WeldZone Simulator



✓ Subject:

Introduction to HS Electromagnetic Fields in Welding




✓ Link

<https://www.highskillz.com/games/weldzone-simulator/>

✓ Process/ Methodology



HS-EMFW



WELDZONE

1

Resistance Spot Welding

—

Introduction to EU EMF Directive (2013/35/EU)

Introduction to assessment process

2

Manual Metal Arc Welding

—

AW wrong position

AW correct position

Introduction to assessment process

In this module you will be guided through the details of an Exposure Assessment Report. You will experience all the steps that ultimately lead to the submission of the Report and decide on the compliance of the welding procedures with the EMF Directive.

ABOUT

CONTINUE

HS-EMFW

As you can see, the 'Intensity' and 'Period' values define the ALs. So, for different 'Intensity' and/or 'Period' values, you get different AL dimensions. In this example, you can experiment on the impact on the Low ALs (Low AL).

Intensity
1000 A

Period
0.25 S

TOGGLE

VIEW TALK REPORT

▲ DIRECTIVE INFO
i WORK SPEC
✉ NOTES

Off Body Paint AL All **AL Low** AL High AL Limb

HSE JOINING



✓ Type of Tool

Serious Game



✓ Subject

Health and Safety in Joining Techniques

✓ Link

<https://weld4.hsz.site/weld4/v2.0.2.191022a/index.html>

✓ Process/ Methodology



HSE JOINING



HSE JOINING



HSE JOINING

★ 0

♥♥♥

53

Plates are stored in a vertical rack. Take them out safely.
First, you need to equip yourself with Personal Protection Equipment.

Work gloves EN 4223

Reinforced work boots

Safety goggles

Heat resistant gloves

Work Overall

Work helmet

Welding Helmet

Heat resistant clothes

First pick here the equipment you need to proceed.

WELD 4.0



✓ Type of Tool

Serious Game



✓ Subject:

Entire Welding Process (Fillet Welder and Tube/Pipe Welder)

✓ Link:

<https://weld4.hsz.site/weld4/v2.0.2.191022a/index.html>

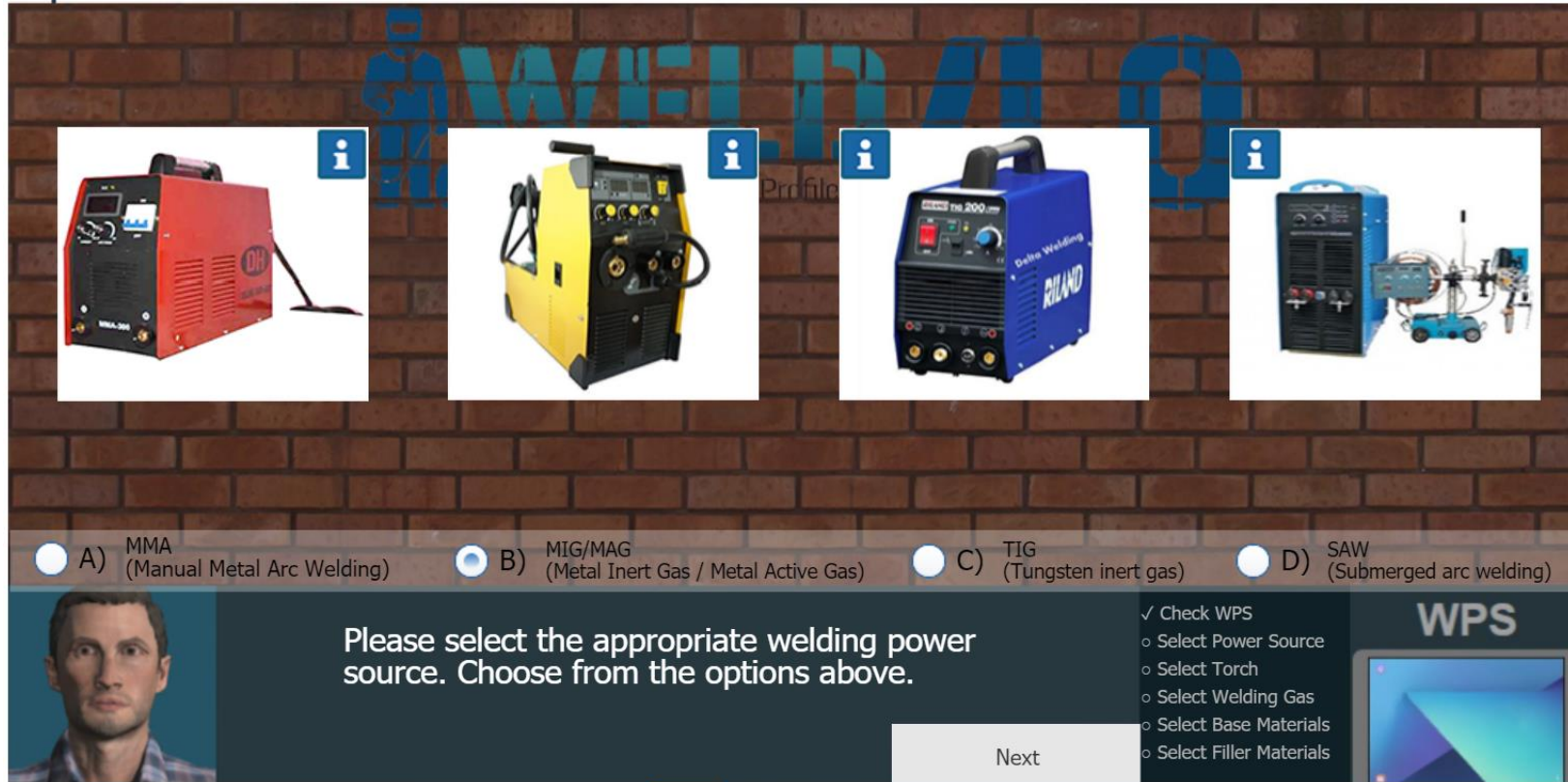
✓ Process/ Methodology



WELD 4.0

Episode 1: The Warehouse

Question 1 of 5



☐ A) MMA
(Manual Metal Arc Welding)

☒ B) MIG/MAG
(Metal Inert Gas / Metal Active Gas)

☐ C) TIG
(Tungsten inert gas)

☐ D) SAW
(Submerged arc welding)

Please select the appropriate welding power source. Choose from the options above.

Next

✓ Check WPS

- Select Power Source
- Select Torch
- Select Welding Gas
- Select Base Materials
- Select Filler Materials

WPS

WELD 4.0

Congratulations! You have successfully completed all preparatory work for the welding job.

Results

WELD 4.0		WELDING PROCEDURE SPECIFICATION WPS-001			
BASIC INFORMATION		JOINT DETAILS			
Product type:	Pipe	Preparation methods:		butt welded tube	
BASE MATERIAL DETAILS				square joint	
Base materials:	Stainless steel			bevel using plasma	
Diameter (mm):	50.8			finish with grinding	
Thickness (mm):	2.5				
FILLER MATERIAL DETAILS		WELDING GAS		WELDING PARAMETERS	
Classification:	TIG Rod ER316L	Shielding:	Gas I1	Process:	TIG
Specification:	SFA 5.18	Name:	ARCAL 1	Current (A):	80
Diameter (mm):	1.6	Flow rate (l/min):	7-9	Welding position:	PH (Pipe Vertical Upwards Progression)
				Torch:	TIG torch

Task List:

- ✓ Check WPS
- ✓ Select Welding Joint
- ✓ Select Measuring Tool
- ✓ Select Fixture
- ✓ Select Grinding Method

Correct Questions: 4

Accuracy: 100%

Attempts: 3



✓ **Type of Tool**

Online Learning Tool



✓ **Subject**

Risk Management in Welding

✓ **Link:**

<https://qmsoft.lamsinternational.com//lams>

✓ **Process/ Methodology**

Select
Course

Choose
Chapter

View
Chapter
(slides)

Move to
next chapter

RMWF

Risk Management in Welding Fabrication . Course support-list of content.

Table of contents

MODULE 2: RISK MANAGEMENT IN WELDING FABRICATION

2.1 Management of Welding Fabrication

- 2.1.1 Introduction to quality assurance in welded fabrication
- 2.1.2 Environmental Management of Welding Fabrication Activities
- 2.1.3 Health and safety management of welding fabrication activities
- 2.1.4 Weld Cracking Management
- 2.1.5 Safety-reliability and risk management of engineering components
- 2.1.6 Critical review of selection of NDT methods
- 2.1.7 Economics and Productivity
- 2.1.8 European norms/directives in welded production fabrication
- 2.1.9 Mathematical statistics in welding

Next Activity →

RMWF

2.1.5 Safety-reliability and risk management of engineering co

The term cost of safety and the resulting risk is a key element

Resources to view

Resource

Safety-reliability resources

Failure cost items are:

- ✓ Design Changes – All costs associated with engineering change due to defect feedback
- ✓ Vendor Rejects – Rework or disposal costs of defective purchased items where this is not recoverable from the vendor
- ✓ Rework – Loaded of rework in production, applicable test
- ✓ Scrap and Material Renovation – Cost of scrap less any reclaim value
- ✓ Warranty -
- ✓ Commissioning Failures – Rework and spares resulting from decent stand corrected during installation
- ✓ Fault Finding in Test – Labor and equipment costs

The above-mentioned cost items depend on the availability level as well. However, they are different at the MANUFACTURER's and USER's approaches. From manufacturer's point of view shows in Figure 2.1.5.6.

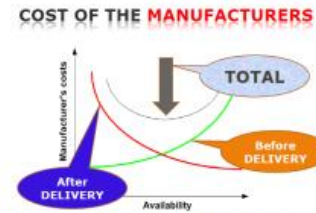


Figure 2.1.5.6: The cost-items at the manufacturers vs. availability level before and after the "system" delivery

Considering the user's approach regarding to the cost items the following costs have to include:

- ✓ Acquisition cost – Capital cost plus installation, transport, etc.
- ✓ Ownership cost – Cost of preventive and corrective maintenance and of modification
- ✓ Operating cost – Cost of materials and energy
- ✓ Administration Cost – Cost of data acquisition and recording and documentation

The Acquisition, Ownership, Operating and Administration Costs influenced by the following factors:

- ✓ Reliability – determines frequency of repairs
- ✓ Maintainability – Affects training, test equipment, down time, manpower, etc
- ✓ Safety Factors – Affects operating efficiency and maintainability

The user's costs of the "systems" also depend on the availability including the price and the costs of possible failure consequences. This fact demonstrated in Fig.2.1.5.7.

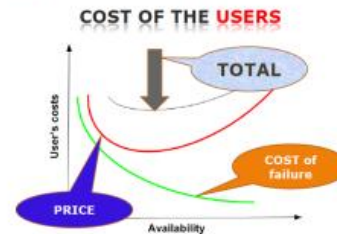


Figure 2.1.5.7: The cost-items at the users vs. availability level (price and possible failure consequence)



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Thank you for your attention!

