

# Innovation in Teaching Methodologies in Welding - Distance Learning Tool for Welding Engineering

T. Rosado, L. Quintino, F. Moll



# Content

- Introduction
- The software
- Advantages
- Conclusions

# Introduction

- Welding being the most important fabrication technique used in manufacturing where a failure in a weld can lead to disastrous consequences, the effort to assure that welding is performed with proper quality is clear;
- One of the ways to reduce failures is to assure the proper training of the persons dealing with welding;



# Introduction

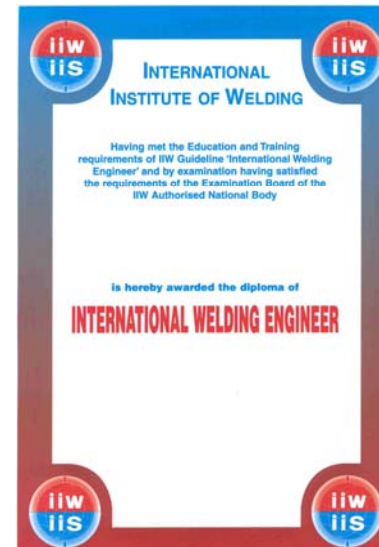
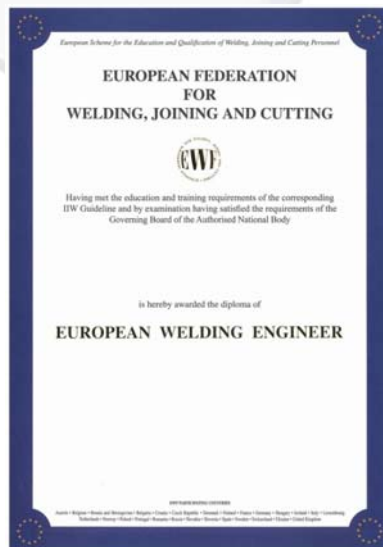
- The introduction of a distance learning tool, like the one being transferred in the DISTOOLWELD project will bring several advantages to the student and also to the teaching organisation adopting this tool;
- Distance learning methodologies are an important component of lifelong learning practices by allowing the course contents to be adjusted to the trainee's needs;
- It will also help countering the lack of IT technologies in welding education. Wider dissemination of IT tools can substantially contribute to modernizing welding education and its appeal to an audience that is much more familiar with IT practices and technological innovation.

# Introduction

- Focused in the development of a new educational tool based on a training product prepared by SLV-Duisburg to be transferred to different target countries (PT, PL, IT, RO), the DISTOOLWELD Project will constitute an important starting point for an increase in the application of distance learning for the qualification of professionals in the area of welding technologies.

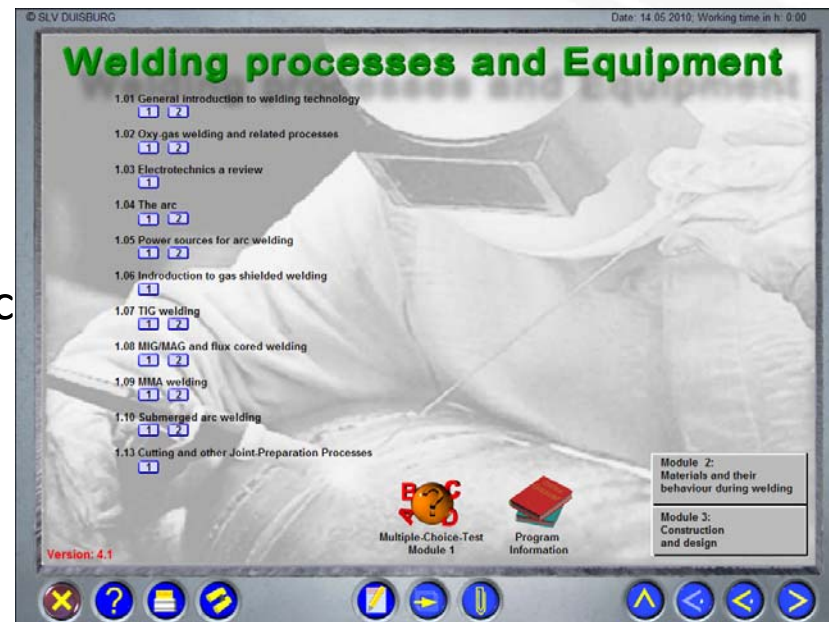
# The Software

- The multimedia based training program developed by SLV Duisburg is a distance learning course designed to self-study for the International Welding Engineer/Technologist course according to IIW/EFW Guideline;
- The course is an approved alternative to conventional classroom training and entitles to participation in the examination part 1 according to IIW/EFW Guideline for welding coordinators;



# The Software

- The content deals with different subjects:
  - The section on the technology of welding processes deals with different welding methods.
  - Material technology includes Material Science, Metallography and the classification of steels.
  - The section in Design includes the computation of forces and tensions and the presentation of welds.
- The program can be used without specific PC knowledge and it doesn't take much time to become familiar with the subject.



# The Software

- The software contains several didactic tools that will help the student using the training material (search function, bookmarks, animations, etc);

© SLV DUISBURG 1.06-1 MIG/MAG and flux cored welding 1 page 3 of 12 Date: 13-05-2010; Working time in h: 0:00

### Welding power supplies

Welding power supplies transfer the electric energy which supplies the necessary amount of heat in the arc during different welding processes. Welding process and welding power supply form a system which has a great influence on the quality of the weld seam. In addition to conventional power supplies electronic machines have more and more been developed and used.

Those can be basically split up in two parts.

- a) the power component
- b) the handling component

Indicated are the mostly used welding torches for gas metal arc welding.

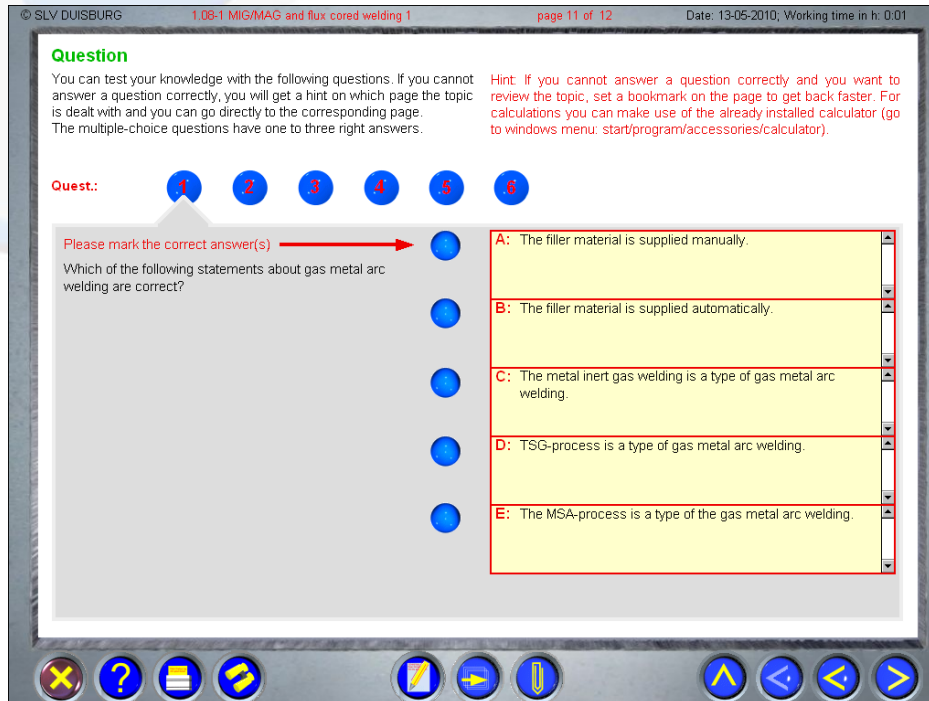


The image shows a 3D rendered scene of a welding workstation. On the left, there is a red welding power supply unit on a small cart. Next to it are three gas cylinders: one green, one grey, and one yellow. To the right, there is a black table with a welding torch and other equipment on it. The background is a brick wall.

Navigation icons: X, ?, list, link, search, back, forward, left, right.

# The Software

- At the end of each chapter there is a knowledge test with subsequent grading. Furthermore, a general catalogue of questions and homework help to prepare for the examination.



The screenshot displays a software window titled "© SLV DUISBURG 1.08-1 MIG/MAG and flux cored welding 1 page 11 of 12 Date: 13-05-2010; Working time in h: 0:01". The main content area is titled "Question" and contains the following text:

You can test your knowledge with the following questions. If you cannot answer a question correctly, you will get a hint on which page the topic is dealt with and you can go directly to the corresponding page. The multiple-choice questions have one to three right answers.

**Hint:** If you cannot answer a question correctly and you want to review the topic, set a bookmark on the page to get back faster. For calculations you can make use of the already installed calculator (go to windows menu: start/program/accessories/calculator).

**Quest.:** 1 2 3 4 5 6

Please mark the correct answer(s) →

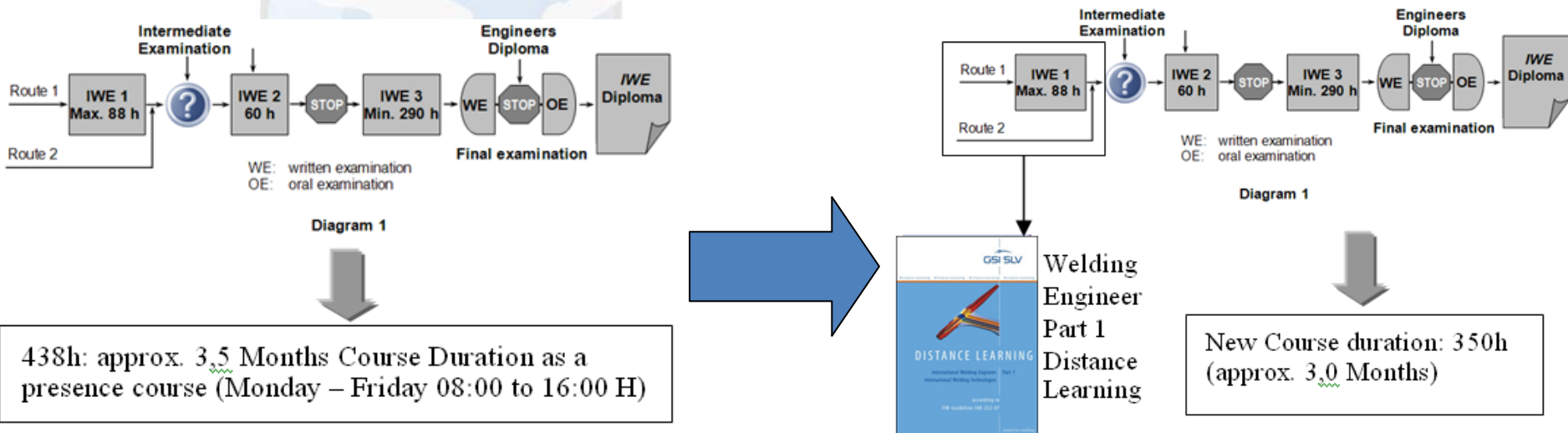
Which of the following statements about gas metal arc welding are correct?

- A:** The filler material is supplied manually.
- B:** The filler material is supplied automatically.
- C:** The metal inert gas welding is a type of gas metal arc welding.
- D:** TSG-process is a type of gas metal arc welding.
- E:** The MSA-process is a type of the gas metal arc welding.

The interface includes a navigation bar at the bottom with icons for back, forward, search, and other functions.

# Advantages

- One of the main advantages that this approach brings to training is a reduction of the hours in the duration of the course.



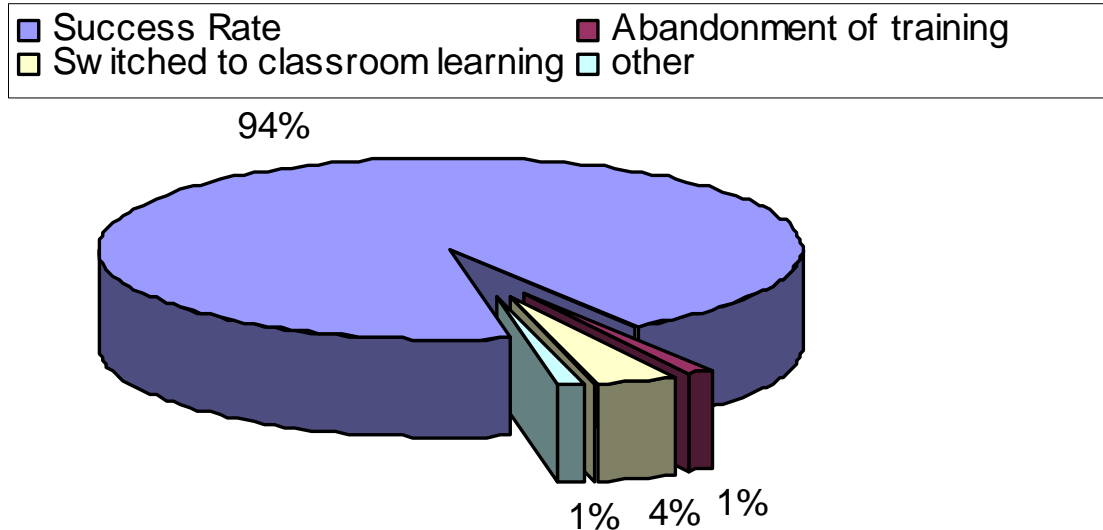
# Advantages

- Other advantages that can also be enumerated regarding the use of this tool are the following:
  - Less travel time and -costs
  - Less downtime in the company
  - Fewer accommodation costs
  - Fewer expenses
  - Flexible planning
  - More appealing training methodologies



# Advantages

- This type of distance learning training has been implemented in Germany since 2001 (English version in 2004) and had 1023 participants since then with a success rate of 94%, which proves that this type of training works in very technical courses like the Welding Engineering Post-Graduation Course.



# Conclusion

- Since 1992 that EWF has been upgrading skill and competencies in welding related courses, contributing to the qualification of over 150.000 trainees. However, this has focused primarily in traditional in-room classes, where the student has to actually be physically in the classroom.
- On the other hand distance learning courses and methodologies as envisaged by the DISTOOLWELD Project are still underdeveloped and require urgent improvement.

# Conclusion

- Therefore, this project will reinforce the European strategy of the EWF network for vocational training in the focused technological areas improving the qualification of persons through distance learning courses;
- This will be done with the transfer of a product with proven quality and well accepted in Germany to 4 European Countries (PT, PL, IT, RO) where distance learning courses have to be developed and improved in order for it to reach more persons, making these training methodologies more appealing and user-friendly for the prospective trainee.

# Thank you

**Tobias Rosado**  
**[tmrosado@isq.pt](mailto:tmrosado@isq.pt)**



**<http://www.ewf.be/DistoolWeld/>**



This project has been funded with the support from the European commission. This publication (communication) reflects the views only of the author, and the commission cannot be held responsible for any use of which may be made of the information contained therein.

