Course Trenchless 101

Course description

The course "Trenchless 101" intends to give a concise insight to the current trenchless alternatives for the new installation and rehabilitation.

It is addressed to engineers from engineering companies, pipe construction and pipe rehabilitation companies as well as local authorities which carry out the planning of such new installation and rehabilitation measures. The aim of this course is to put the participants in the position to actively participate in discussions about the selection of suitable methods.

The course consists of five modules: Introduction, Repair, Renovation, Replacement and New Installation. Overall they contain eight presentations, several virtual construction sites and two documentations of construction sites. Each module is rounded off by a list of questions for self-testing the learned contents as well as by a final test.

Course structure:

1. **Introduction**
   - Presentation 1: “Trenchless 101 – Part I – Introduction”
   - Presentation 2: “Trenchless 101 – Part II – Rehabilitation”
   - Exercise: Questionnaire ‘Introduction’
2. **Repair**
   - Presentation 3: “Trenchless 101 – Part III – Repair”
   - Virtual construction site: Short liner
   - Virtual construction site: Robot process
   - Exercise: Questionnaire ‘Repair’
3. **Renovation**
   - Presentation 4: “Trenchless 101 – Part IV – Renovation”
   - Virtual construction site: Cured-in-place lining process
   - Virtual construction site: Cured-in-place lining with light hardening
   - Documentation: Cured-in-place lining
   - Exercise: Questionnaire ‘Renovation’

4. Replacement

- Presentation 5: “Trenchless 101 – Part V – Replacement”
- Virtual construction site: Pipe bursting
- Documentation: Static pipe bursting
- Exercise: Questionnaire ‘Replacement’

5. New installation

- Presentation 6: “Trenchless 101 – Part VI – Non-steerable new installation”
- Presentation 7: “Trenchless 101 – Part VII – Steerable new installation”
- Virtual construction site: Microtunnelling
- Presentation 8: “Trenchless 101 – Part VIII – Horizontal Direction Drilling”
- Virtual construction site: HDD-Verfahren
- Exercise: Questionnaire ‘New installation’
- Final exam: Questionnaire ‘101 Final exam’

The teaching content is divided into courses, which are subdivided into learning units. They are oriented towards a teaching session. Learning units in form of documented slide collections, scripts as well as exercises and tests are available for all courses.

The course is supervised by a tutor, who moderates the forums and answers special questions of the participants via email.

The documented slide collections are completely provided with audio comments for better understanding and additional information.

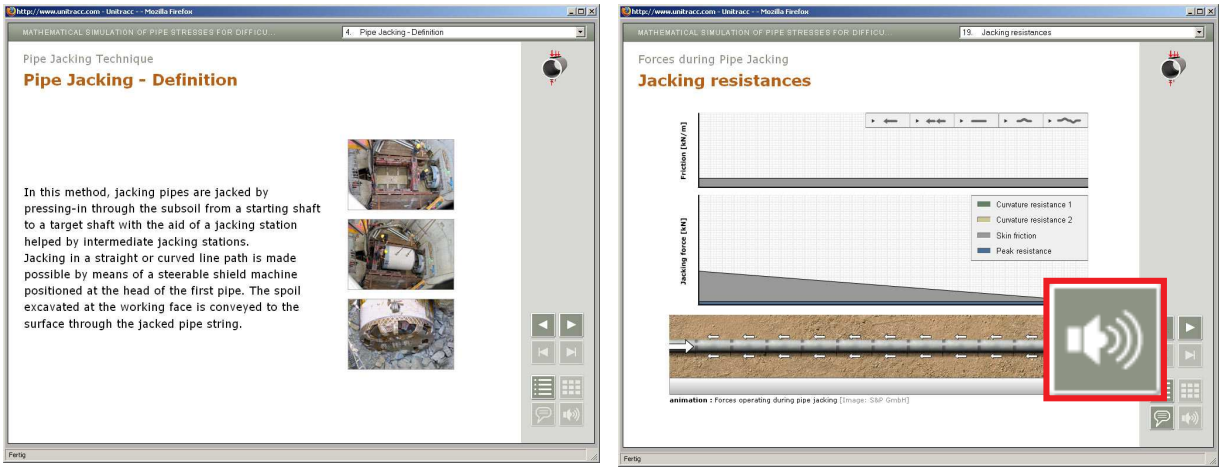


Figure: Documented slide collections with audio comments

Among other test types multiple choice test check the knowledge. Here, the learner get the opportunity of testing their personal learning progress.

The final exam finishes the course. After successful participation a certificate is handed over.

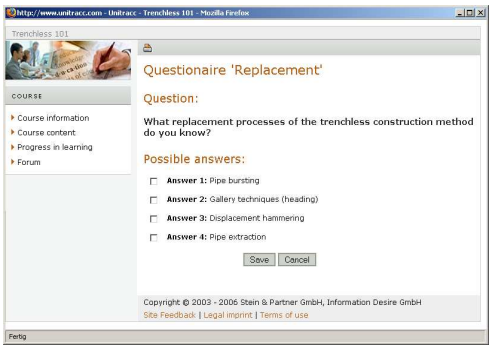
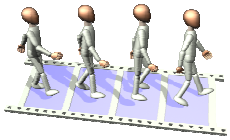
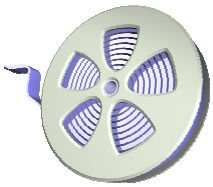
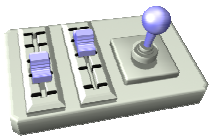


Figure: Example screen of a multiple choice question

Types of Media

Besides the classic media types text, image, diagram and table, also the following types serve to illustrate facts and processes in a better way:

				
Construction site documentations	**Animations**	**Videos**	**Virtual construction site**	**Interactive construction site**

Construction site documentations provide the learner with comprehensive descriptions of each working step from the first movement of the hand to the last one at the construction site in written and visual form.

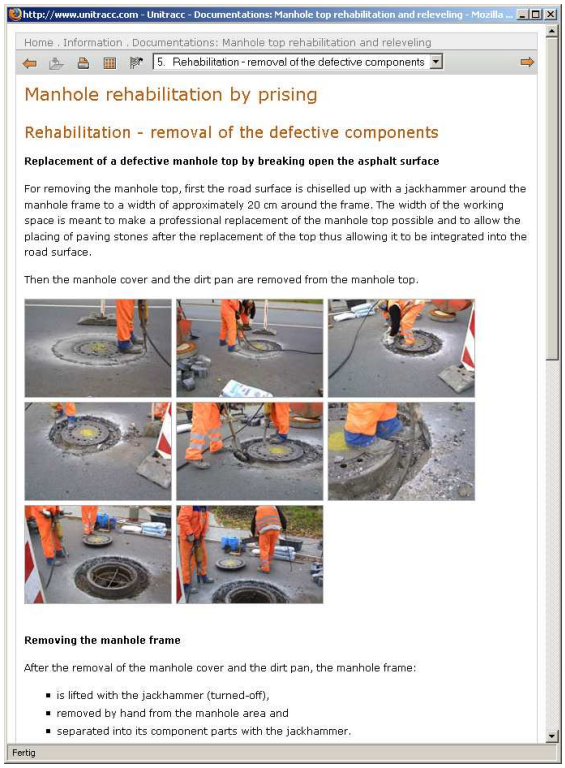
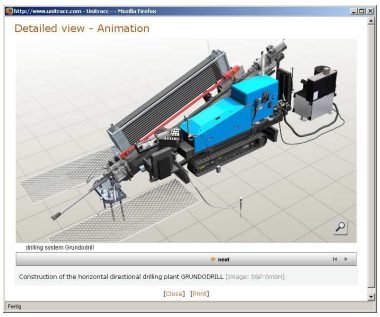
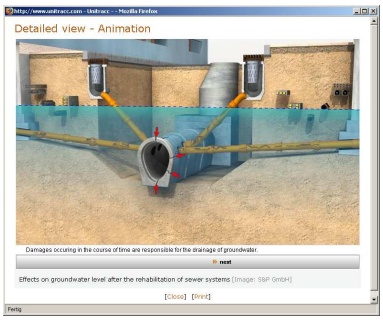


Figure: Example screen of a construction site documentation

The **animations** in the slide presentations clearly explain complex technical facts. The two- or three-dimensional models illustrate methods and processes. The level of detail is nearly arbitrary and depends on the complexity of the process to be presented.





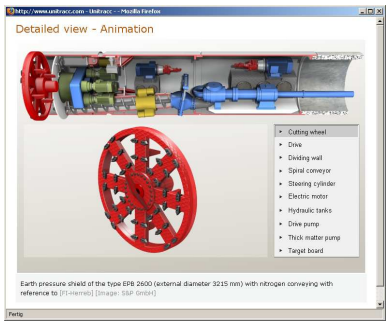


Figure: Example screens of animations

A special form of exercise is the so-called "**interactive construction site**". This site presents practical situations with the aid of detailed 3D scenarios. Because of the high degree of freedom of the interaction that is allowed, a high measure of decision competence is demanded from the user and taught. As in practice, incorrect decisions often lead to errors only later.

Figure: Example screen of an interactive apparatuses simulation for determining the correct application

A derivative of the "interactive construction sites" are the "**virtual construction sites**". These sites depict process sequences with a high degree of animation from the excavation of a construction site up to its vacating in a linear navigation process.

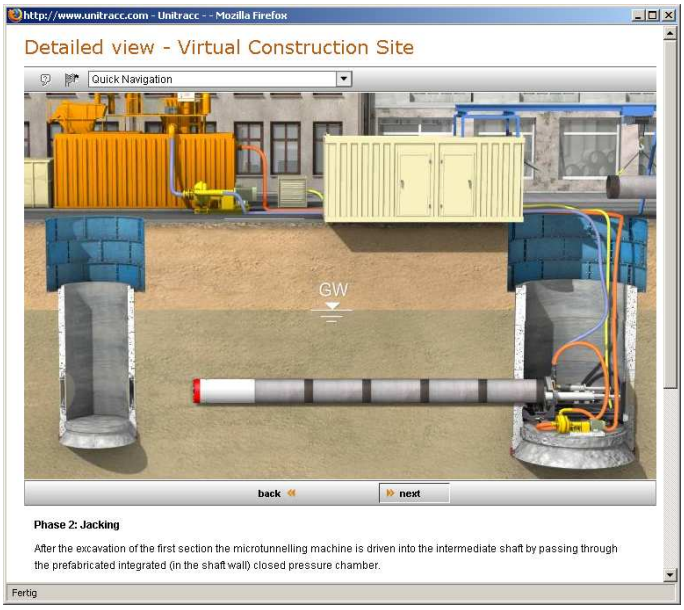


Figure: Example screen of virtual construction site

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