

## **ORGANISING AND ACHIEVING POST – GRADUATE STUDY ON TRENCHLESS TECHNOLOGY IN ENVIRONMENTAL ENGINEERING**

The winning entry for the 2008 ISTT NO-DIG Award in the category of Academic Research or Training Aid was made to Professor Zbigniew Rusin – the Dean of Civil and Environmental Engineering Faculty, University of Technology in Kielce, Professor Andrzej Kuliczkowski - Chairman of Polish Foundation for Trenchless Technology and a board of tutors including D.E. Dariusz Zwierzchowski, D.E. Agata Zwierzchowska and D.E. Urszula Kubicka for organising and running a *Post – Graduate Study on Trenchless Technology in Environmental Engineering*.

The course was organised by the Faculty of Civil and Environmental Engineering, University of Technology, Kielce, Poland in association with the Polish Foundation for Trenchless Technology. The study started in November 2006 and ended in June 2007. The curriculum of the study comprised 215 hours of lectures, laboratory work and tutorials, all of which were totally dedicated to trenchless technology. In all there were 28 subjects covering all aspects trenchless technology, potential problem areas that may be associated with the techniques and solutions that might be applied to overcome them. These subject groups included:

- Trenchless renovation and replacement of pipelines,
- Trenchless repair and sealing of pipelines,
- Designing of the construction of renovation coatings,
- Strategies of trenchless renewal of sewerage and water supply pipelines,
- Horizontal directional drilling,
- Microtunnelling and pipe jacking,
- Designing of pipelines in trenchless pipe laying,
- Drilling fluids in trenchless pipe laying,
- Optimum choice of trenchless pipe laying methods,
- Structural expertises of pipelines,
- Trenchless testings of pipelines,
- CCTV inspection of pipelines,
- Geotechnical engineering in trenchless technology.

Alongside the basic lectures there were tutorials, laboratory work as well as technology presentations. The Director of the Study, Professor Kuliczkowski, who is well known in Poland as a promoter of trenchless technology invited colleagues from other universities to give guest lectures and to provide additional material

There were 28 postgraduate participants in the study from cities across Poland including: Warsaw, Katowice, Kielce, Wroclaw, Lublin, Rzeszow, Torun, Radom, Siemianowice Slaskie, Kluczbork, Ostrowiec Swietokrzyski, Tomaszow Lubelski, Nisko and Koluszki. To ensure good national representation. The participants represented professional organizations involved in operations such as network design, water treatment, pipe, material and equipment producers and contractors.

The study was partly prepared in an E-learning version which is being developed further. The judges felt that, although there are a number of trenchless technology modules available for students on *graduate* courses and there are many post graduates working to gain Doctorates, the Kielce course was the first fully organized *post-graduate* course of its type in the world and was a very worthy winner of the No-Dig Academic Award 2008.

**Figure and Picture captions:**

**Pic. 1:** Participants of the post - graduate study on Trenchless Technology in Environmental Engineering



**Pic. 2:** Participants of the post - graduate study during the workshop



**Pic. 3:** The workshop of the post - graduate study



**Pic. 4:** Presentation of the diploma works



**Pic 5 and Pic 6:** Professor Andrzej Kuliczkowski hands out ‘PFTT’ and ‘ISTT’ international certificates of completion of the post – graduate study on trenchless technology



## Enclosure 1

### Curriculum of the Post – Graduate Study

No.	Subjects	Lectures (the amount of hours)	Laboratory and tutorials (the amount of hours)
1.	Trenchless renovation and replacement of pipelines	20	-
2.	Horizontal directional drilling (HDD)	5	-
3.	Plastics in underground infrastructure	12	-
4.	CCTV inspection of pipelines	6	2
5.	Trenchless repair and sealing of pipelines	8	-
6.	Managing of the sewer and water systems maintenance	4	-
7.	Static – strength calculations of the pipelines	7	6
8.	Microtunnelling and pipe jacking	10	-
9.	Applied hydraulics in trenchless renovation and pipe laying designing	5	-
10.	Contemporary problems in water supply	6	-
11.	Trenchless testings of pipelines	6	-
12.	Pipes made of rigid and elastic structure	3	-
13.	Geotechnical engineering in trenchless technology	5	-
14.	Impact moling and ramming	4	-

15.	Criteria of optimum choice of material and structural solutions of pipelines	4	-
16.	Drilling fluids in trenchless pipe laying	4	-
17.	Inspections and renovation of sewer collectors of large - diameter	8	-
18.	Structural expertises of pipelines	5	-
19.	Designing of pipelines in trenchless pipe laying	6	6
20.	Pipes in trenchless pipe laying technologies (jacking pipes and pulling in pipes)	4	-
21.	Optimum choice of trenchless pipe laying methods	4	-
22.	Strategies of trenchless renewal of sewerage and water supply pipelines	4	-
23.	Utility tunnels	5	-
24.	Trenchless methods of cable laying	3	-
25.	Designing of the construction of renovation coatings	6	7
26.	Non-conventional sewage systems	6	-
27.	Laboratory testings of pipes	4	2
28.	Financing of the infrastructural projects	4	-
29.	Diploma seminar	16	-
30.	Diploma work	8	-
	<b>Total:</b>		<b>215</b>