

Statements to be rejected today:

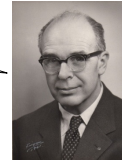
A young nerd, 1981:

640K ought to be enough for anybody



An old civil engineer, 1985:

Women cannot become engineers because they cannot walk in high heels on building sites!



Some skeptical CAD users, 2005:



It is not possible to learn how to use MicroStation and InRoads in less than three months!

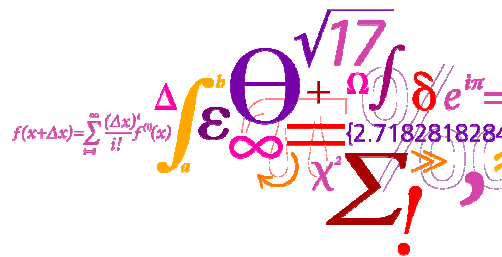
Teaching Engineering Students to Use InRoads in Three Weeks May 16, 2012

Marianne Rask

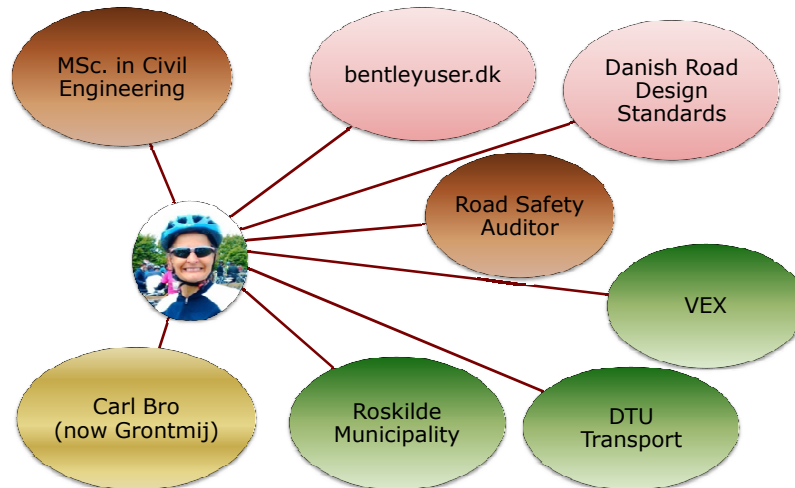
External Associate Professor

Department of Transport, Technical University of Denmark

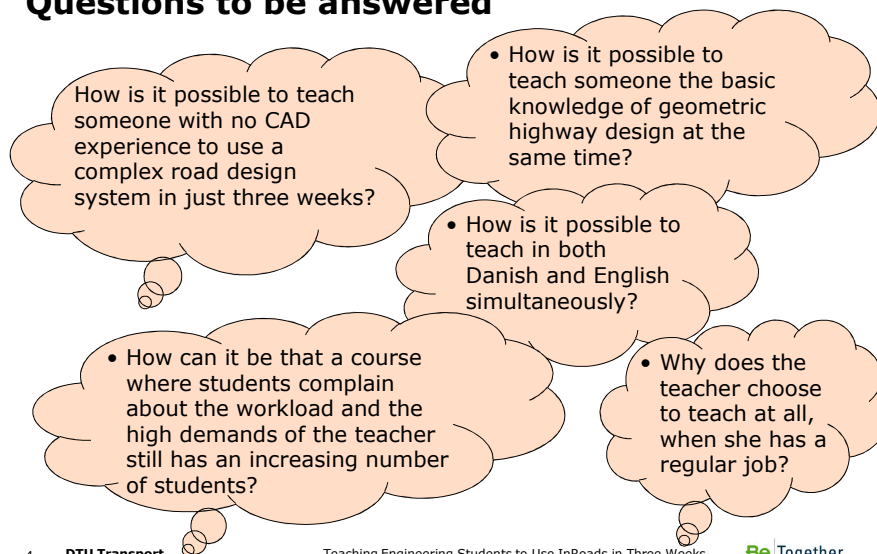
MarianneRask@Roskilde.dk



Marianne Rask



Questions to be answered



The secret is...



Teaching geometric highway design

• Course plan

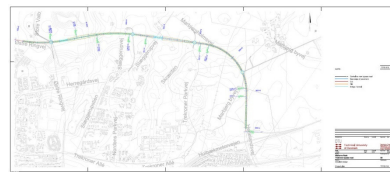
Date	Day	Exercise	Title - Lecture	Subjects covered - Exercise
2012-01-02	Monday	0 + 1	MicroStation basics	Model files, References, Level- and file naming standards, Layout file.
2012-01-03	Tuesday	2	Terrain modelling	Digital Terrain Model, Evaluation of DTM.
2012-01-04	Wednesday	3	Horizontal alignment	Geometric basis for horizontal alignment design, Designing alternatives.
2012-01-05	Thursday	4	Vertical alignment	Geometric basis for vertical alignment design, Designing alternatives.
2012-01-06	Friday	5	3D alignment/Routing	Combination of horizontal and vertical alignment.
2012-01-09	Monday	6	Typical Cross Section	Creation of typical cross section including end conditions.
2012-01-10	Tuesday	7	Superelevation	Creation of a 3D road model with superelevation.
2012-01-11	Wednesday	8	Design phases and tender documents	Design phases, Tender documents. WRITTEN TEST from 10:00 to 12:00
2012-01-12	Thursday	9	Priority junctions	Geometric design of a priority junctions.
2012-01-13	Friday	10	Roundabouts and grade separated junctions	Road marking
2012-01-16	Monday	11	Volume calculation	Cross Sections and Volumes
2012-01-17	Tuesday	12	Visualisation	Visualisation tools in InRoads and MicroStation.
2012-01-18	Wednesday	13	Railway design vs. road design	Finishing design.
2012-01-19	Thursday			Finishing design.
2012-01-20	Friday		Conclusion	Delivering project before 15:00.

Prepared ingredients

- A number of future road projects
- Project structure
- Dgnlibs
- Seedfiles
- Color table
- Drawing layout
- Project.pcf
- Basis map themes
- Civil.xin (default preferences, Named Symbologies, features)
- Excel sheet for geometric values
- ITL with predefined components using styles
- Excel sheet for cost estimation
- Cell libraries (road signs)
- Custom line styles (road marking)



- Their results:
 - Basis map DGN
 - DTM
 - Horizontal alignment
 - Vertical alignment
 - Road templates
 - IRD
 - Volumes and cost
 - Project drawings



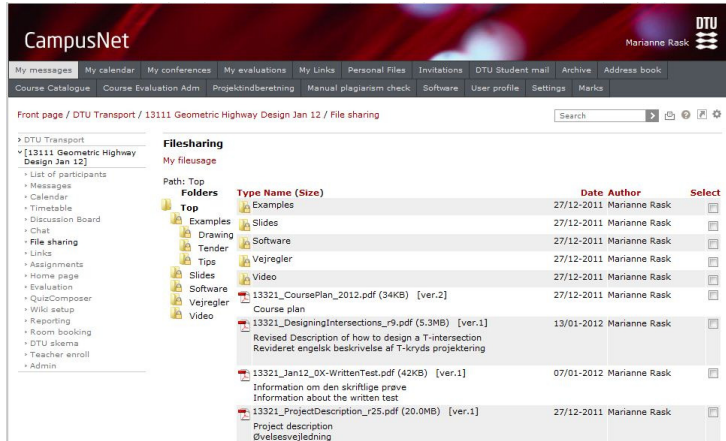
Teaching geometric highway design

- Teams of two persons and an individual test
- Calculating road design values based on the Danish standards
- Preliminary design
- Report & drawings



Teaching InRoads

- Training material on CampusNet



Teaching InRoads

- Detailed project description

Geometric Highway Design 16. January 2012

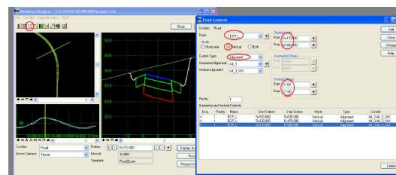
Prepared by: Marianne Rask

Note: Words typed with italic are Danish (danske).
Some screen dumps may vary from yours because of a newer software version.

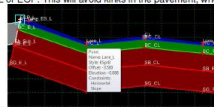
Table of contents:	
0 Introduction and set-up	2
1 MicroStation basics (<i>basal MicroStation</i>)	3
2 Terrain modeling (<i>terrainmodellering</i>)	17
3 Horizontal alignment (<i>linieføring</i>)	25
4 Vertical alignment (<i>længdeprofil</i>)	33
5 3D alignment (<i>trace</i>)	37
6 Typical section (<i>normalthværsnit</i>)	40
7 Roadway Design and superelevation (<i>overhøjde</i>)	49
8 Cost estimation (<i>økonomisk overslag</i>)	56
9 Intersection (<i>vejkryds</i>)	58
10 Road marking (<i>vejmærkning</i>)	61
11 Volumes (<i>masseberøgning</i>)	65
12 Visualisation (<i>visualisering</i>)	69
13 Conclusion (<i>afslutning</i>)	72

7.3 Roadway design - superelevation

- 7.3.1 Apply superelevation to the horizontal curves.
This can be done by adding vertical point controls to the edge of pavement.



TIP: It may be a good idea to ensure that all points on top of your pavement (such as Lane) are constrained to the vector between CL and EOP, and horizontally to either CL or EOP. This will avoid kinks in the pavement when the edge is lifted.



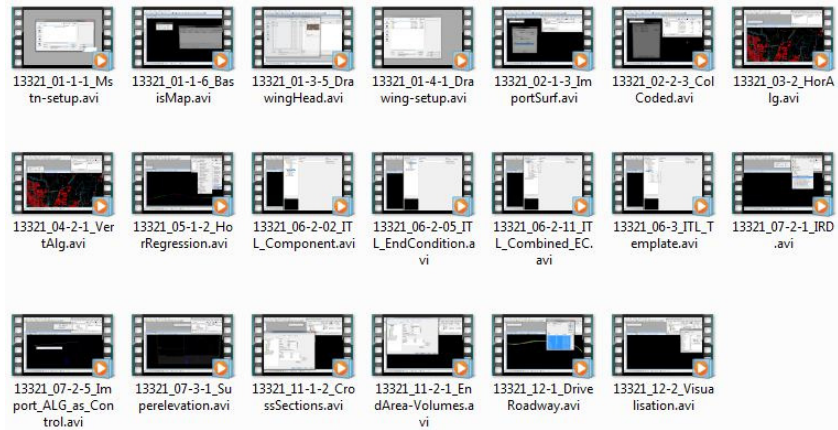
Change this in the InRoads Template Library (ITL), and synchronise the templates in the IRD.

TIP: Use "Temporary dimension line" to check that the width and slope are changing correctly. It is found when right-clicking in the Roadway Designer Cross Section window.

- 7.3.2 Save the IRD.

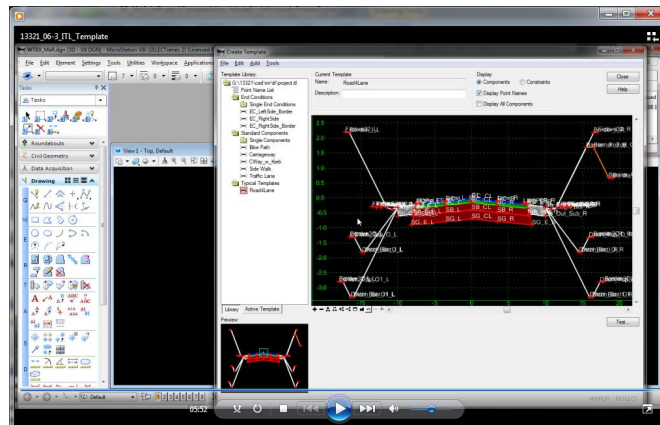
Teaching InRoads

- Videos



Teaching InRoads

- Example

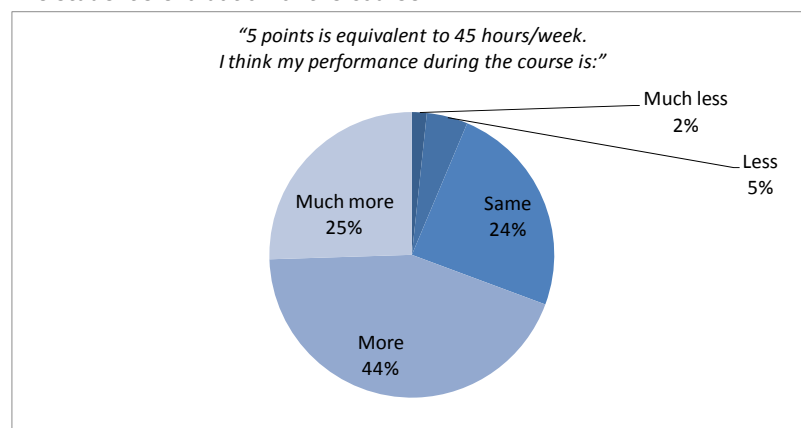


Danish and English

- Danish students as well as foreign students
- Lectures in Danish
- Demonstration of the daily exercise in English
- Selected Danish road design standards in slides in both Danish and English
- The project description in English
- Simplified intersection design procedure

Work load

- They need to be present every day
- The student's evaluation of the course:



Teacher demands

- "Firm but fair"
- Real life engineer
- The student's evaluation of the course:

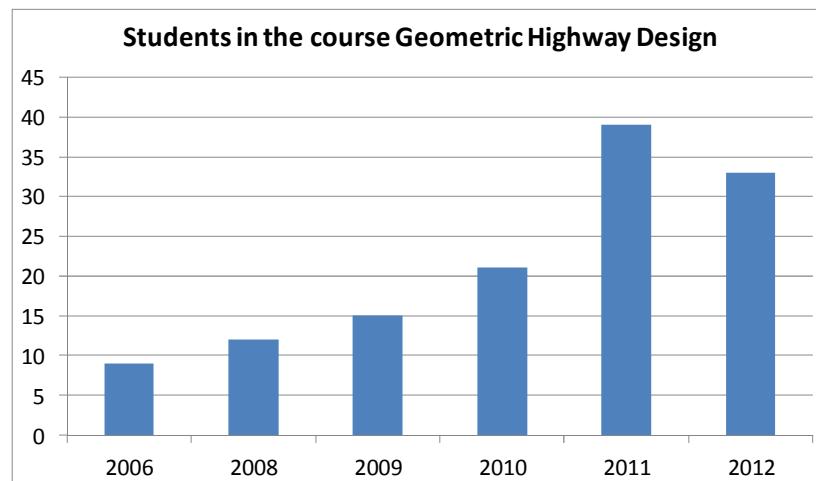
The course is very interesting and truly practical. The learning material is quiet wide and useful for a lot of other courses. The uploaded videos made easier to complete to project

I didn't get all the comments from the lecture because it was in Danish. And the Roundabout material are in Danish. It is difficult for international student to learn by self

The videos made the biggest difference, and they be used a later time with another course

gained a lot knowledge about these programs - MicroStation and InRoads. Enjoyed creating my own content and also made a lot of mistakes that are necessary to learn

Number of students



Why teach?

- A need for new InRoads/MicroStation users
- It is educating:
 - Road design standards
 - Software
 - A push out of the comfort zone
- You can spot future colleagues
- It's fun!

Thank you for your attention!

