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University of Cantabria

THE VISUAL IMPACT ISSUE IN THE CIVIL ENGINEERING CURRICULUM

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Presentation: slides and elements

Slide 3: European Landscape Convention
Slide 4: General aims of the contribution
Slide 5: Related acronyms. LIA and VIA
Slide 6. VIA as an engineering problem. Different approaches.
Slide 7 to 10. Landscape Integration Study (LIS)
Slide 11 to 13. The subject of VIA in the MSc of Civil Engineering in the C.E. School of Santander, Spain.

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In 2000, the EU released the "European Landscape Convention". In terms of the civil engineering infrastructures design, this document consolidates the need to know how to assess the visual intrusion that such design is going to produce on the landscape. This task is integrated within the corresponding Environmental Impact Assessment.

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At the Civil Engineering School of Santander, the assessment of visual impact has been a matter of research since the year 2000, and it has been **master level subject since the year 2006.** The purpose of this contribution is to describe the scientific, technical and technological scope of its content, outlining its most noteworthy educational elements and forms.

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LIA AND VIA.

1) First step: to obtain the Landscape Units Maps. This task pertains to the field of activity called "landscape impact assessment" (LIA), the details of which are beyond the scope of the purpose outlined in this communication (which has more to do with geomorphological, biological, and patrimonial features) .

2) Having the landscape units map available, the analysis of the visual effect that an infrastructure may have on the population observing the construction, and the physical changes it produces on its site is what is known as the "visual impact assessment" (VIA).

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VIA as an engineering problem. Different dimensions.

-The technological problem of how to **properly** visualize its effect just when construction has not yet been undertaken,

-The technical problem of how to **reliably** assess this effect,

-The administrative problem of how to **adapt** that assessment to the environmental planning in force,

- The social problem of how to **convey** that assessment to the population, a task that proves to be the most controversial and delicate of all.

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Spain has signed the European Landscape Agreement and, as a result, environmental legislation obliges very diverse types of infrastructure projects to incorporate in the environmental impact study a chapter dedicated to landscape.

The regulatory development creates the concept of Landscape Integration Study (LIS) as the main technical vehicle of instrumentation for visual impact assessment.

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The following sequence orders the typical **work flow in a LIS**:

1) Identify the vantage points, the Landscape Resources visually affected and the scenic routes (roads with exceptional landscape value).
2) Select viewpoints and visual itineraries of greatest public affluence which will include, in addition to others, the following: main communication roadways, population nuclei, principal recreational, tourist and massive affluence areas, and panoramic viewpoints.

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3) Obtain the ZVI (Zone of Visual Influence) and the viewshed for each viewpoint selected, marking short, medium and long distances from the observation point, determining the number of potential observers of the landscape being studied, but differentiating their proportion in relation to the following categories: residents, tourists and itinerants. Also the estimated duration of observation in the case of scenic routes or itineraries.

4) The Observation Points will be classified as principal and secondary, according to the number of potential observers, the distance and duration of the view.

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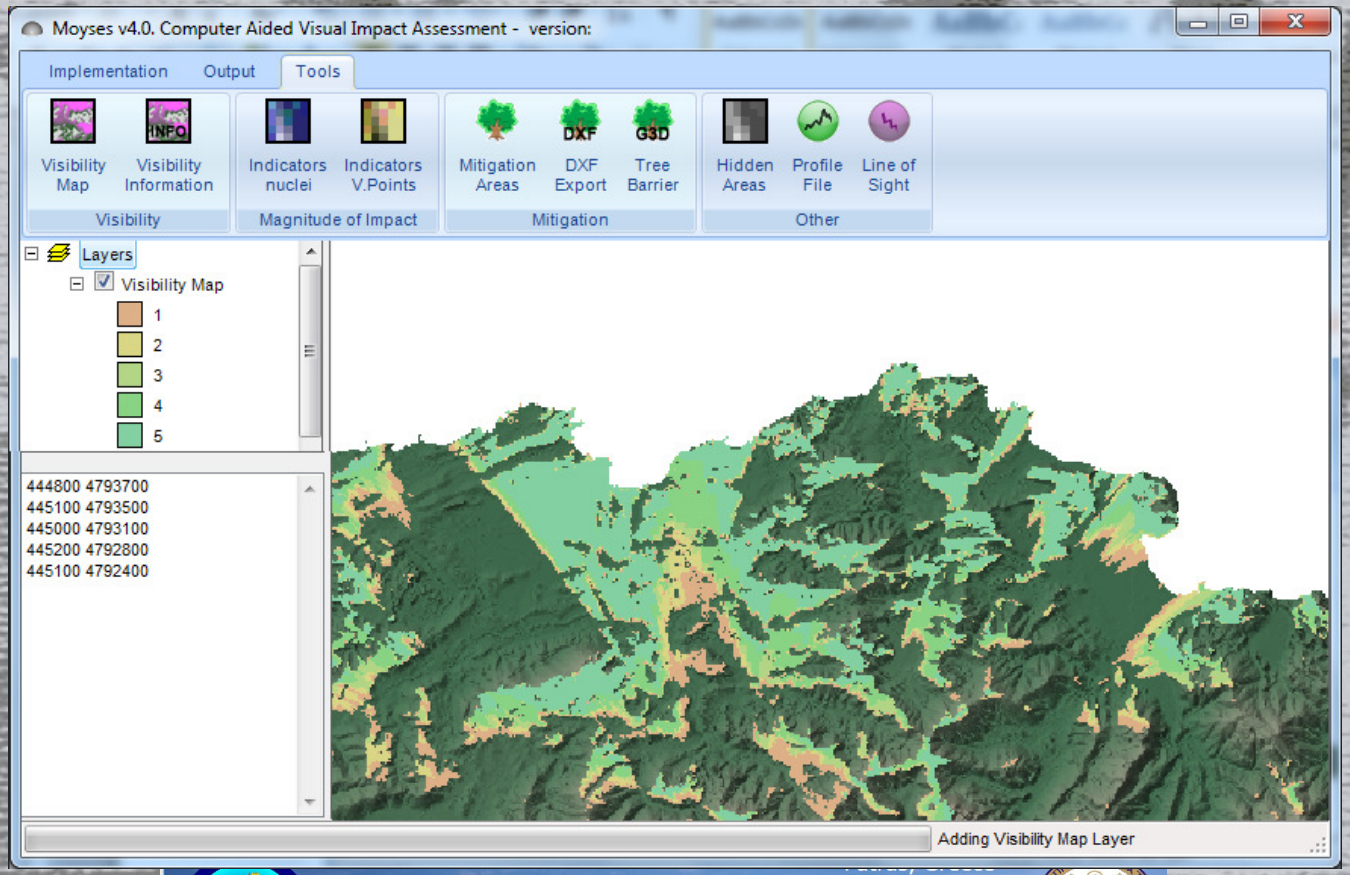
Zone of Visual Influence



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LESSON	THEORY	LAB	TUTORIAL	EVALUATION	GROUP WORK	INDIVIDUAL WORK
Computer Graphics (CG). Fundamentals. CG Standards.	1h.	0				
CAD Systems. The Advanced Program Interface (API) of a CAD system	1h.	2h.				
Civil Engineering CAD Systems. The API of a Civil Eng.CAD system		7h.				
GIS for VIA and LIA		2h.				
Tools of Virtual Reality for Civil Engineering	2h.	3h.				
VIA in Civil Engineering projects and works		6h.				
FINAL PROJECT			3h.	3h.	15h.	30h.
TOTAL	4h.	20h.	3h.	3h.	15h.	30h.

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OBJECTIVE	INDICATORS
Graphic data capture	**a. Altimetry (mdt)** **b. Planimetry (nuclei, motorways, forests, viewpoints, landscape itineraries)**
Computer-assisted civil engineering systems.	**a. Alignments** **b. Profiles** **c. Cross sections** **d. Corridors**
Preparations previous to visual impact assessment.	**a. Assess population nuclei affected by the impact** **b. Classify them by distance (short, medium or long).** **c. Make a table of affected population.** **d. Assess motorway sections affected by the impact.** **e. Classify them by distance (short, medium or long).**
Visual Impact Assessment	**a. Practise defining a visual scope with sections radiation.** **b. Definition of a view-shed: spatial analysis**

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OBJECTIVE	INDICATORS
Simulation: Pre-processed.	**a. Create mdt in tiff format with 5m pixel.** **b. Select adequate photos for covering.** **c. Shade the road zone in AutoCAD with MPOLYGON type entities** **d. Export the previous entities to shapefile** **e. Export population nuclei to shapefile.** **f. Export motorways to shapefile**
Simulation. Project creation	**a. Create the project.** **b. Load the terrain** **c. Load the photos (or part of them)** **d. Load the shapefiles** **e. Create vectorial layer groups. Import vectorial layers** **f. Load toponyms** **g. Create places category** **h. Incorporate places**
Visibility results.	**a. Create infos category** **b. Put various information about the roadway** **c. Create views** **d. From visible population nuclei to roadway info** **e. From first order visible roadway stretches to roadway info.**
Semi-automatic generation of computer graphics	**a. Capture computer graphics from the simulator** **b. Capture real photographs** **c. Filter elements and superimpose**

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Thank you!