The use of GIS-tools in Regional and Urban planning applied to the Águeda Region (Portugal)

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ABSTRACT

Until recently the creation of thematic maps (e.g. geological units maps, geotechnical units maps, slope maps, permeability maps, and transportation facilities) was used as a tool for regional and urban planning but, many times, the interpretation of the results was mainly based on a qualitative view of the combined data. Moreover, the construction of complex maps involving different impact factors was very difficult. In this presentation a new approach looking for the enlightenment of previous data is carried out.

The engineering geological map of Águeda region was already done based on the analysis and interpretation of the geological and geotechnical data obtained in the studies undertaken in the region (Duarte, 2006). These data has various origins, scales of acquisition and purposes. The geological units are based on the lithological map for the region, in the scale 1:10 000, as well as a photo-geological study and a surface reconnaissance. The geotechnical units were interpreted based on field work, *in situ* tests, laboratory tests on collected samples, and the collection of information contained in geotechnical reports. Raw materials map was obtained from geological and geotechnical characteristics of soils and rocks in the area under study. The transportation facilities (roads, railway, rivers, etc.) was determined from the 1:25 000 topographic maps and the aerial photography.

The different thematic maps were treated as factors and given a variable weight for the construction of the final map - construction suitability map. It is on this phase of processing of the final map that the GIS prove to be a reliable and powerful tool. It is possible to test different scenarios, and how the different factors impact the final result. The constant actualization of data allows the presentation of different scenarios that permits some degree of freedom and aids the planning professionals in the decision making process.

The suitability construction map and the risk of flooding map in Águeda Region were produced based on two equations, respectively: Suitability = Permeability + Slope + Geotechnical Units, and Risk = Vulnerability x Hazard.

The geological and geotechnical information contained in the resulting maps, because of its simplicity, allows its use by technicians with diverse trainings and with responsibility for Regional and Urban planning.

Although the presented geotechnical maps and complementary tables contain enough information, they are documents that may be subject to constant updating as new data is obtained.

Such maps are only useful for Regional and Urban planning and, consequently, for the choice of the best places to built or preserve, if we consider the factors that most influence the general characterization of the region and if based on a set of significant geological and geotechnical data, accurate and detailed.