

# Relevance of map products in civil engineering

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## **The Relevance of Map Products within Civil Engineering**

The planning and design of all Civil Engineering projects such as construction of highways, bridges, tunnels, dams etc. are based upon surveying measurements. Moreover, during execution, project of any magnitude is constructed along the lines and points established by surveying. Thus, map products (maps, images, charts, plans) are basic requirements for all Civil Engineering projects.

## **RELEVANCE OF MAP PRODUCTS IN CIVIL ENGINEERING**

A map, despite popular belief not only helps someone to find an area. In fact, there is a lot of information that is needed by professionals in every sector. Data Gathering through land surveyors, GPS, and aerial photographs, along with Data Capturing through scanning and imagery are activities that collect topographic data assisting with the mapping process. The results of these processes are considered map products. Map products consist of map (water, shed area, road network, precipitation, land use and soil), images, plans (set of drawings or two-dimensional diagrams used to describe a place or object), charts (a map depicting navigation) and digital files. One of the main professional's field that uses map products are civil engineering. This is a discipline that deals with the design, construction and maintenance of the physical and natural built environment including work such as roads, buildings, airport, tunnels, dams, bridges, system for water supply and sewage treatment.

Civil engineers primarily use topographic map products in preliminary engineering design and analysis. Maps products also allow the engineers to plan the site location, analyse the environment (identifying various underground feature and levelness of the earth), design infrastructure and even provide critical infrastructure protection. They are key to planning the site location as it contains high-level functions such as economic analysis, routing utilities, visualization of concept options, modelling, and benefit/cost alternatives analysis. It helps with comprehensive decision making tool for emergency assessment, preparation response and recovery activities. They also use map products to route utilities such as plumbing and electric wires. In the preliminary design and analysis phase for a project area an engineer need to know the different soil types. (M. Henry, personal communication, September 16, 2018) “ If a drainage network is being designed for a project area, each catchment area needs to be assigned a run off coefficient value which is directly dependent on the soil type. Each soil type has a coefficient which states if the soil type or land uses will allow percolation of water through the soil or depending on the values is can have almost no percolation or land use.” Engineering geological maps or plans are a resourceful database of ground information on lithology, structure, morphology, soil and rock mechanics, hydrology and ground investigation conditions, among others. The purpose of these maps or plans depends on scale, such as: i) detailed survey studies, plans and cross-sections (large-scale): 1: 50 to 1: 250; ii) general maps or plans (large to medium-scale): 1: 1, 000 to 1: 10, 000; iii) regional maps and planning purposes (medium to small-scale): 1: 50, 000 to 1: 200, 000. (Chamine et al. (n. d.)) Without map

products and relevant surveying information, civil engineers cannot perform their work effectively. These engineers' uses map products to identify various underground feature and levelness of the earth. In addition, map products help engineers to identify different boundaries.

Map products involves geology which is the study of the earth, the material of which it is made of, the structure of those materials and the effects of the natural forces acting upon them and is important to civil engineering because all work performed by civil engineers involves earth and its features. Some engineers use geologists to examine rocks for important oil and natural gas. Hydrographic charts help civil engineers specialized in for coast also use map data for conducting wave analysis, erosion prediction models and storm surge analysis to see how coastline areas will be inundated and assess the possible damages. According to Marc Henry “ In analyzing the different storm surge levels and damage based on the extent of flooding, the coastal engineers worked out a damage curve value that could be applied to calculate or predict the total cost of damage based on a particular category storm event.” Hydrographic map products would also assess if dredging of a sea to build infrastructure would affect surrounding areas. Another reason why map products are relevant in the civil engineering industry is because they allow the professionals to undertake critical analysis of the environment. Highly accurate images displayed geographically can give civil engineers information like environmentally protected areas relief, commercial activity and even traffic flow which allows them to see the site opportunities and constraints. These digital maps allows these professionals to keep track of urban and regional indicators, forecast future community

needs, and plan accordingly to guarantee quality of life in liveable communities for everyone. In essence Environmental Analysis allows you to view patterns, trends, and relationships that were not clearly evident without the visualization of data. ReferencesAnderson, Charles & Johnson (2003).

The impressive psychology paper. Chicago: Lucerne Publishing. Smith, M. (2001). Writing a successful paper. *The Trey Research Monthly*, 53, 149-150. Entries are organized alphabetically by surnames of first authors and are formatted with a hanging indent. Most reference entries have three components: 1. Authors: Authors are listed in the same order as specified in the source, using surnames and initials. Commas separate all authors. When there are seven or more authors, list the first six and then use “ et al.” for remaining authors. If no author is identified, the title of the document begins the reference. 2. Year of Publication: In parenthesis following authors, with a period following the closing parenthesis. If no publication date is identified, use “ n. d.” in parenthesis following the authors. 3. Source Reference: Includes title, journal, volume, pages (for journal article) or title, city of publication, publisher (for book). ConclusionA civil engineers duty is to maintain structural integrity of the environment and map products are necessary for a complete task. The mapping products enable civil engineers to easily manage, reuse, share, and analyze data, saving time and resources.