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Virtual Reality as a Decision Making Tool in Construction Management

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Title:	**VIRTUAL REALITY AS A DECISION MAKING TOOL IN CONSTRUCTION MANAGEMENT**
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Abstract:	Several decades of research and development placed new tools in the hands of engineers, builders, supervisors, surveyors, contractors and all people associated with the construction industry. In this paper, we are referring to computer software developed by the author's team that uses Building Information Modeling and available modern technologies, enabling data inspection and results interpretation through simple observation in a stereoscopic virtual world. It is a tool for research, perception, verification of intuition and self-instruction. Here, this advanced technology is introduced as an influential decision making tool in construction management. It is well known that managerial decisions in the construction industry are very critical because possible negative consequences are irreversible. It is also known that construction management deals constantly with multi parameter problems. Therefore correct decision making is not easy. This stands not only when traditional construction methods are used, as for example in small scale buildings in many Mediterranean countries, but also when highly industrialized procedures of either open or closed construction systems are followed, as those in large scale structures and massive developments. With the offered virtual reality software tool any potential on the spot modification of the building structure is shown in detail, the influences on the architectural aesthetics and environmental footprint are considered, the effects on the static and seismic response of structures are taken into account, the recalculated reinforcement is automatically implemented in the structural framework, the detailed drawings are readjusted accordingly and the moderated costs are shown in a precise analytical quantity survey report. Furthermore, introducing the Interactive Step Optimization Method along with the software tool, the scientific knowledge is clearly established and the managerial decisions are surely facilitated. Safe conclusions are clearly made by analyzing the virtual actions and their consequences instead of the decisive actual ones, thus limiting the risk of any erroneous decisions. A representative example dealing with length changes of a full-height continuous column of a three-storey building serves to illustrate the process and to justify the reported considerations. It is emphasized that all the above take place in real time, in an environment formed by continuous frame projections, maintaining a constant three-dimensional visual contact with the detailed building model and providing stereoscopic visualization (via stereoscopic glasses), human interface, animating capability, speech response and all the technological features that any contemporary multimedia may offer. If the Chinese saying "one picture is equivalent to 1000 words" is true, then viewing 60 such pictures per second is equivalent to condensed human experience leading to correct managerial decisions through precise scientific observation and verification.