

Fayoum University,
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Smart Building Materials And Their Use Mechanism As An Entry Point To Create An Integrated Balance Between Sustainable

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A Thesis Submitted to the
Faculty of Engineering at Fayoum University
in Partial Fulfillment of the
Requirements for The Degree of
Master of Engineering Sciences

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Title of Thesis: Smart Building Materials And Their Use Mechanism As An Entry Point To Create An Integrated Balance Between Sustainable

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ABSTRACT

Buildings are among the highest energy consumption areas, as they consume approximately 40% of global energy consumption, are responsible for approximately the same percentage of greenhouse gas emissions, and also constitute about 70% of electricity consumption. As part of the global trend to reduce energy consumption, there is a need for an alternative to traditional building materials and replacing them with smart building materials to reduce high energy consumption, including lighting, cooling, and thermal insulation.

Smart materials are considered a relatively new term for materials and products that have variable properties and are able to change their shape or color in response to physical or chemical influences. Therefore, we find that smart materials technologies are the key to the competitive advantage of the twenty-first century to reduce energy consumption.

The research also dealt with presenting a clear design methodology for selecting smart materials when designing by setting specific criteria for each material and clarifying and defining each criterion, including arriving at an evaluative value for a single material by

setting relative weights for each criterion, thus in the manner of Thomas Saati, which opened the way for differentiation between materials

The research also dealt with an applied study of these materials on an existing building (the traditional materials used in the building were replaced with smart materials suitable for use according to the function, and the difference occurring in the building was clarified by calculating the available energy of the material for one day and also dealing with the life span of each material and also calculating the standard recovery period for each material) To determine the extent to which these materials achieve sustainability.