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# An Overview of Value Engineering in Component Fabrication and Assembly

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## Abstract:

The growing emphasis on sustainability and efficiency in industrial processes has led to the adoption of waste reduction strategies. Fabrication and assembly as a form of manufacturing technology requires waste elimination in the fabrication throughput. However, extensive studies that address the use of VE in component fabrication and assembly are lacking. This paper aims to examine the role of Value Engineering (VE) in component fabrication, particularly in engineering applications. VE is a systematic approach that optimises product value by eliminating unnecessary costs and improving performance. The strategy focuses on functionality, cost-effectiveness, and stakeholder collaboration. VE is applied at various stages of component fabrication throughput, such as material selection, design optimisation, process streamlining, raw material, and finished components supply chain management. The literature assessment established that significant waste reduction potential and economic benefits could be achieved through VE implementation in engineering component fabrication and assembly, such as eliminating overproduction, excessive inventory, faults, transportation, waiting time, and superfluous processing. However, the challenges and limitations of the approach include resistance to change, resource constraints, and interdisciplinary collaboration. Emerging trends and future research directions for implementing VE in waste reduction efforts within the components fabrication industry are also discussed.

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**I. Introduction**

Value Engineering (VE) is a methodical, organised strategy that seeks to increase functionality and quality while minimising needless expenses to maximise the value of systems, processes, or products [1]. Using Value Engineering concepts in component production and assembly is essential for reducing waste, improving overall efficiency, and advancing sustainable manufacturing processes [2]. This assessment looks at the effectiveness of value engineering as a method for cutting down on waste during component fabrication [3]. It allows manufacturers to recognise and classify waste streams frequently seen in component production processes [4]. Through planned research and review, these wastes, which include overproduction, excessive inventory, faults, transportation, waiting periods, and superfluous processing, are found [5]. Value Engineering enables firms to apply focused changes and optimise the manufacturing process by identifying these inefficient processes [6].

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