

## **Analysis of the Premature In-Service Failure of Engine Mounting Towers of an Industrial Generator**

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**Abstract :** This paper presents an investigation of the premature in-service failure of the engine mounting towers that form part of the bedframe commonly used for industrial power generation applications. The client during a routine in-service assessment of the generator set observed that the engine mounting towers had cracked. Thus, this study has investigated in detail the origin of the crack and proffered solutions to prevent a re-occurrence. Seven step problem solving methodology was followed during this paper. The study used both experimental and numerical approaches to understand, monitor and evaluate the cause and evolution of the premature failure. Findings from this study indicated that the failure resulted from a combination of varied processes from procurement of material parts, material selection, welding processes and inaptly designed load-bearing mechanics of the generating set and its mounting arrangement. These in-field observations and experimental simulations provided insights to design and validate a numerical finite element sub-model of the cracked bedframe considering thermal cycling: designed as part of these investigations. Resulting findings led to a recommendation of several procedural changes that should be adopted by the manufacturer, in order to prevent the re-occurrence of such premature failure in future industrial applications.

**Keywords :** Engine, Premature Failure, Failure Analysis, Finite Element Model

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