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A systematic approach for managing design changes on global collaborative projects: a case study anlysis of the Medupi structural steel.

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ABSTRACT

The complexity of construction works means that it is hardly possible to complete a project without changes to the plans or the construction process itself. Every project is liable to variations ranging from changes of mind on the part of the clients, their consultant, to unforeseen problems raised by the main contractor or sub-contractor.

Medupi Power Station is South Africa's biggest and most complex construction project to date. The main contract for Medupi was signed by Eskom and Hitachi on the 30th of October 2007. The subcontract was signed by Hitachi and Murray & Roberts on the 6th of December 2007. Murray & Roberts had limited recent experience in the construction of power stations, which resulted in a Cooperation Agreement being executed by which all dealings between Hitachi and Murray & Roberts were to be conducted in utmost good faith and Hitachi undertook to bring the necessary expertise to Murray & Roberts to fulfil its role in the partnership.

The biggest challenge on the structural component of this project is the management and implementation of revisions from Hitachi Power Europe. Hitachi has provided continuously changing Basic Engineering Designs, which have led to:

a. Significant delay and disruption to Murray & Roberts.
b. No recovery of the learning curve savings and little prospect of future recovery.
c. Inefficient connection design, detail engineering and fabrication process leading to Murray & Roberts incurring significant additional costs and losses.
d. An inability to achieve the fabrication rates allowed in the prices as discussed and agreed with Hitachi as part of the collaborative process.
e. The re-incorporation of seismic considerations within the Hitachi design.

From the empirical and theoretical findings of the study, it was found that the system currently used by Murray & Roberts for managing design changes was ineffective. There is a need for a design management tool/method which would lead to less claims and disputes.

The effects of frequent changes in design include difficulties in settling variation claims, disruption in the flow of production, dispute resolution and regrettably litigation which have their negative effects on the project's completion time and cost. To ameliorate these negative effects on the execution of the Medupi project, there is the need to develop a functional and effective design change management system.

It was found that Global Collaboration had a big impact on the magnitude of design changes that occurred on Medupi. This further illustrated the importance of the use of a design management tool/method on a global collaborative project like Medupi or similar projects.

The study indicates that the Web-based Interface System 'diMs' is the tool most likely to effectively manage design changes on a global collaborative projects like Medupi other similar global collaborative projects.