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This proposed paper is based on current PhD research by Mr Christian Mclening.

Applying an integrated sustainable design approach early in the design process: Case study ARUP Ltd.

This paper investigates the way that the design process can be managed at the crucial early stages of product development. A summary trial of several current design tools has been applied to a live design project at ARUP Ltd the architectural design and engineering consultancy, within their Product Design department (1).

This work builds on the sustainable design tool evaluation that was presented by Christian Mclening at the 10th International Conference: Sustainable Innovation 05 entitled: *Developing a new SPDS: Sustainable Product Design Specification tool* (2).

It is these early stages of commercial design projects that have a major influence on the direction a project takes, and on the overall effectiveness of the project. This initial stage is also when project costs are at their lowest so early decisions become more financially important as development progresses, such as tooling, prototyping, marketing and construction cost issues.

By investigating this early design stage, often when stakeholders are forming the PDS (Product Design Specification) (3), best practice and opportunities for improved sustainable and efficient project management can be applied.

Several design tools have been identified for this research, such as the Sprout Index of dematerialization by the London based sustainable design consultancy SPROUT Ltd (4) and it is acknowledged that this early stage needs a thorough multidisciplinary approach. Traditional PDS tools can be used to establish the

more immediate product requirements, while management and development process issues must also be integrated such as ISO:14062 ⁽⁵⁾. Tools such as TRIZ ⁽⁶⁾ (a creative problem solving tool) can be used to generate creative solutions and also allow stakeholders to communicate despite different backgrounds, and these can be combined with more traditional creative design tools and methods such as synectics and morphological charts.

The combination of tools is important as they all contribute subtly different points of view and use different languages and perspectives. The objective is to use these tools to bring people, views, knowledge and the whole project together allowing all parties to understand how the project is developing and running through the various stages of product design and development.

The paper will address the current tools that will be used, identifying their strengths, weaknesses and differences, and the stage of the design development process they may suit, as well as the knowledge and background of the user that they would be most appropriate for. Also to identify how each tool maybe used to identify sustainable opportunities to the development team be they economic, social or physical.

The approach and combination of design tools and communication tools will also be linked to the legislation and best practice. These management, process, protocol and management consideration will be outlined to create a basic management model to allow the approach to be applied to a live project.

A case study project will be show to evaluate the research. ARUP associates are a major global architectural and engineering consultancy. The Product Design department has the task of researching and developing projects and opportunities for ARUP in the Product related area. The London based studio will be the focus for the case study and the case study project will be tested during two periods in 2008. The first stage will be an evaluation of the current research and design approach employed by the ARUP Product Design team (March 2008) The second period will be the application and study of the new design approach on a live product at ARUP London (August-September 2008). Although the product has not been identified at the time of writing, recent projects include: Stadium seating, a modular barrier/handrail system and a seating system for the recently open Eurostar rail terminal. The trial project will have similar issues and scale, such as; mass production, manufacturing and development issues. Multiple stakeholders and contractors etc.

Initial results presented will evaluate the effect of apply the new design approach and compare with previous approaches used by ARUP (as Identified in visit 1 in March 2008).

These initial results of the case study will be presented at the Malmo Conference 2008.

Areas for specifically analysis include:

Ease of communication between team members and stake holders, suppliers, manufacturers, users, managers, etc.

Effective development of the initial PDS: Product Design Specification stage.

How the approach addresses sustainable issues, economic, social and technological.

Identify best practice

References:

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