

## ENGINEERING DESIGN KNOWLEDGE/INFORMATION MANAGEMENT

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This report includes summaries of the papers presented on the theme of engineering design knowledge/information management at ICED05. Summaries are listed alphabetically according to the first author.

**Campbell, Culley and McMahon** investigate information push strategies where designers are delivered information in anticipation of their needs (in contrast to requesting a specific piece of information). A model for push technologies is described along with strategies to improve push-based approaches in engineering information management.

**Charles and Eynard** introduce the purpose and structure of a simulation data management environment for managing numerical simulation data in parallel with product development. This paper describes how the simulation data management environment provides simple and transparent access to product data and information relating to simulation models.

**Culley, Davies, Hicks and McMahon** assess methods for analysing and providing document quality, highlighting issues associated with applications in engineering design. Document quality assessment criteria are defined and an audit of the various document types conducted. Culley et al. highlight a need to improve access to engineering document quality information.

**Fuxin** identifies enabling preconditions for managing product variance using digital mock-ups. The influence of geometry-based digital mock-up's on traditional product development is explored. A case study is presented involving the application of digital product development to produce a system for the automatic design of a vehicle packing system.

**Gardoni & Dudezert** investigate the impact of knowledge management systems on engineering design activities. Ways to value the financial, strategic and operational impact of knowledge management systems are reviewed. Means for measuring knowledge mastered, along with a means for valuing the efficiency of knowledge management, are presented.

**Gsell, Homburg and Müller** define the attributes suitable for identifying a ship's component parts. A product data model is developed where a shipbuilding project is structured into either physical/technical views or a system view. In this context an information and communication system model is developed for transferring product data between design teams.

**Hami-Nobari and Blessing** introduce a methodology for describing variant-rich products and the interdependencies between their parts. This paper includes a case study involving a vehicle axel assembly. It is shown that using effect-oriented verses a code-based system for describing parts, results in less product documentation effort.

**Hicks, Culley and McMahon** develop a generalised model of the functional elements of information systems infrastructure for Medium Sized Enterprises (SME). Functional elements (e.g. CAD, payroll and accounting) and the associated computer support systems are identified. The relationships between various functional elements are determined to provide a reference for organisations to audit their information infrastructure systems.

**Hicks, Huet, Culley and McAlpine** analysed the contents of 3000 pages of design information contained in sixteen engineers logbooks. Classes of information items were identified along with the frequency of occurrence of each item and the role of the engineer within the company. This study gives an insight into the engineer's logbook which is intended to assist in the development of new tools for managing and developing this resource.

**Mathelin, Boujut and Tollenaere** studied a design team whose role was to represent "the voice of the customer" during the automotive design process. This team provided an interface between designers and the projects general ergonomic requirements. Generic reports containing design and the ergonomic knowledge were implemented in a product data management system, allowing information sharing and capture within a common context.

**Mekhilef, Bigand and Bourey** present the general system architecture to support project memory. Maintaining competencies generated during a design project and traceability of key project decisions are key objectives. A case study concerning the preliminary design phases for an aircraft turbo-pump is described along with examples of knowledge to be captured.

**Opletal and Roller** developed an integrated product model which allows the support of a main manufacturer by several part suppliers while protecting the intellectual property of a part supplier. Information access is allowed through a blackboard-architecture which serves as both an interface and a place for exchange of information for participating parties. The proposed architecture can allow communication between multiple CAD systems.

**Pol, Jared, Merlo and Legardeur** identify generic prerequisites for the development of an extended product life management tool in SME's. A case study is presented involving researchers who observed and participated in preparing for the implementation of new product data and process management tool.

**Ponn, Braun, Pecquet and Lindemann** developed a web-based "Competence in Design and Development" method knowledge database for product development methods. The database provides the designer with: descriptions of methods; examples of method applications; software tools and; forms and templates. The method knowledge database supplements the personal transfer of method knowledge.

**Radford, Williams and Tennant** propose a process model for sharing knowledge that aids the implementation of craftsmanship in the automotive industry. The study involves premium vehicle manufacturers developing of new products. The intention is to increase awareness of craftsmanship attributes and to assist suppliers in meeting target requirements.

**Restrepo** presents an approach creating design ideas that uses images as query seeds instead of keywords. An empirical study showed that the designers started by searching images according to function, then context and finally form. When frustrated, designers browsed the search system. An approach to indexing and searching large image collections is proposed.

**del-Rey-Chamorro and Wallace** produced a theoretical model of the process of accessing and retrieving information from technical documents. The model was based on observations of an empirical study involving experienced designers. Factors such as the influence of a designers experience and familiarity on the efficiency of obtaining information are discussed.

**Turley, Williams and Tennant** outline issues such as consideration of craftsmanship and product quality during the new product introduction process. The paper presents results from a design quality audit system which was utilized by suppliers to a premium vehicle manufacturer. Results showed an earlier detection factors affecting craftsmanship.