Section 1 – Virtual Enterprise

1 Consortium as a Virtual Enterprise in Project Planning

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Abstract

In the networked business environment it is a challenge to choose partners, contractors and the preliminary structure of the project. Both the contractors and the end customer need a means for formalising, analysing and visualising the early project planning phase.

Existing and developing communication methods are not enough in project planning. The early negotiation phase can be made more concrete by a distributed project simulation tool. This tool can be used by the project managers and strategic personnel in participating companies on a practical level. If the project scheme and resource profiles are handily available to each party, project goals, product modules and subcontractor combinations can be matched during the negotiation sessions.

The aim of the paper is to find solutions for early project planning phase in modern networked environment. The focus is on consortium as a virtual enterprise, on business practices and various problems in project management. The paper introduces Simo-2 software and explains how it can be used in preliminary project planning. It discusses today's business environment, which drives companies to form more efficient business networks. The overall model of Simo-2 as well as the software architecture used are also described.

Keywords

Virtual enterprise, project planning, project modelling, power plant industry.

2 Designing the Virtual Enterprise

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Abstract

Much research has been conducted on what a virtual organisation is and how it should work. With this paper we address the question of how a virtual enterprise can be designed to best support two concurrent engineering processes: the product engineering process and the process engineering process. We present a framework for the organisational design and the changing business roles of the 'business architect' who drives the various phases of the life-cycle of the virtual enterprise. We briefly refer to the 'Value System Designer', a set of methods and tools to select partners, reengineer business- and logistics processes and to set up an information and communication platform which have been developed in the TELEflow and the 'Virtuelle Fabik' project. We focus on the experiences from the many undertaken engineering projects and summarise critical success factors in designing virtual enterprises Thus the paper contributes insights and applicable know-how for companies and managing engineers that act as the architects of virtual enterprises, for example as leaders of project consortia, leader of joint ventures or as first-tier suppliers co-ordinating supplier (sub-) nets.

Keywords

Virtual Enterprise, Agility, Organisational Design, Value System, Business Architect.

3 DESO: GDSS for VE Configuration Management

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Abstract

The fast development of transportation and communication means lead to emerging global business and such a new form of co-operation as Virtual Enterprises (VE). Based on VE concept a product should be designed for VE, as much as the VE should be designed for the product. In order to design a VE that can be reconfigured to meet the changing production demand, one has to understand the relationship between the structure of system "product – process - resources". General objective of the paper is to develop a generic methodology and a group decision support system for VE configuring management.

Keywords

Virtual enterprises, configuration, agent-based decision making

4 Typological Issues in Industrial Collaboration

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Abstract

Industrial co-operations can be described according to specific views or filters highlighting specific attributes or dimensions of the network, nodes, relationship between the nodes, etc. Within this paper dimensions by which various types of industrial collaborations can be classified will be analysed. Overall goal of this contribution is the specification of a more formal and systematic view on the phenomenon of industrial co-operations. This paper is part of the activities of the ESPRIT Working Group IiMb (subgroup V) aiming at a better and systematic understanding of the various dimensions of industrial co-operations.

Keywords

Extended Enterprise, Virtual Enterprise, Industrial Collaboration

5 Duality of Integration in Collaborative Engineering

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Abstract

The development of new products is gradually changing into a process too complex and demanding for one company to perform. To satisfy the current market demands in terms of time, costs, quality, and innovativeness, collaboration with other companies is needed. Integration between the collaborating organisations, the people and means involved, and the relevant processes is considered a necessary condition to achieve the goals set. In the context of the development of new products this approach is called Concurrent Enterprising or Collaborative Engineering.

Management of Collaborative Engineering is difficult and not yet well understood given the limited success rate of many current collaboration efforts. Many problems still exist with implementing and using mechanisms for achieving the necessary integration. By introducing the concept of duality of integration we hope to contribute to understanding these problems. The concept is borrowed from the concept of duality of structure in Giddens' structuration theory. Such an understanding will help to eventually develop useful tools for managing Collaborative Engineering.

Keywords

Collaborative Engineering, Product Development Process, Structuration Theory

6 R&D Support Network, Community for SMEs

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Keywords

Concurrent Engineering , business networking, virtual enterprise, taxonomy, information broker

7 Project/Programme Management in the Virtual Enterprise - The Implications for SMEs

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Abstract

Until recently, the integrated application of formal project management (PM) concepts, techniques and software has been confined to major undertakings in the public sector, defence and process industries and to other industrial undertakings involving major capital expenditure. There is however a trend towards the use of PM concepts and techniques for a wider range of applications and for much smaller undertakings [Harrison 1992]. Enterprises, in particular Small and Medium Enterprises (SMEs), find themselves increasingly to be part of larger supply chains or 'virtual enterprises', where the need for effective communication and co-ordination is of paramount importance.

This paper identifies and discusses the reasons behind this trend and goes on to identify the potential for the introduction of distributed systems for project/programme management with particular reference to the potential within SMEs. The role to be played by low cost systems for communication is emphasised.

Keywords

Virtual Enterprise, Project Management, Programme Management.

8 A Three Dimensional Perspective on Extended Manufacturing Enterprise

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Abstract

In the highly competitive and volatile markets of the 21st century, manufacturing organisations must be agile and efficient in their response to rapidly changing customer requirements. Increasingly companies are concentrating upon the development of their core competences and making increasing use of their suppliers and sub-contractors. However, the competition in best practice manufacturing business is no longer supplier against supplier but supply chain versus supply chain (Craven, 1998).

The extended enterprise may be considered as a logical progression from the extended supply chain, which requires close collaboration of all participating businesses. As such, these independent enterprises need to integrate their goals as well as their logistics in order for them to be able to collaborate effectively in the long term.

An investigation of extended enterprise practice within a developing country is currently underway at The University of Huddersfield. This is based on a questionnaire, a series of case studies and a series of semi-structured interviews with a range of companies in Indonesia. This paper discusses a simple model for the extended supply chain concept and develops it further into the concept of the extended enterprise and then examines the implications of these for the developing nations.

Keywords

Supply chain, Extended enterprise, Goal integration, Agility, Core competence.

Section 2 – Knowledge Management

9 MANAGEMENT OF KNOWLEDGE USING INTEGRATED TOOLS FOR SMEs (MaKe-IT SME)

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Abstract

The objective of MaKe-IT SME is to develop holistic methods and tools for the securing, sharing and further development of engineering and manufacturing knowledge. MaKe-IT SME will provide methods and an IT solution suitable to the specific needs of SMEs to flexibly manage the knowledge in-house as well as with cooperating partners. An early and thorough integration of IT with means for human resource management and knowledge engineering scenarios will guide this project. In general, the project will try to organise and make available business-relevant knowledge whenever and wherever it is needed.

Keywords

Knowledge Management, Knowledge Engineering Storage Model, 1st Prototype Development.

10 Knowledge Management for the Extended Enterprise

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Abstract

Knowledge management focuses on empowering an organisation to develop and use its human resources. The extended enterprise challenges knowledge management concepts. Applications like giving staff access to multi-corporate knowledge and information raise issues such as protection of corporate knowledge. Knowledge management for the extended enterprise should cope with evolving patterns of co-operation between organisations and to embed knowledge management into the individual organisations. We provide a learning framework for knowledge management in the extended enterprise. As knowledge management is currently limited to a single organisation, we discuss several knowledge management paradigms and identify key issues in, and requirements for knowledge management in the extended enterprise. To embed knowledge management we generalise the concept of a learning organisation to learning in the extended enterprise. We conclude by examining knowledge management in different inter-corporate settings.

Keywords

Knowledge management, organisational learning, extended enterprises

11 Requirement Engineering & Knowledge Management

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Abstract

Inconsistencies, uncertainty, ambiguity and incompleteness of customer requirements are characteristics often associated with requirement engineering of "one-of-a-kind" complex products. The question that naturally arises is: why is this so? The answer stares us in the face that it is due to the current practices that are involved in requirement engineering. This is often attributed to the disparity of consideration of enterprise knowledge when a decision is made because of a lack of a global overview of the complete process. There is often a lack of essential knowledge of design, manufacturing, maintenance and demolition processes. Functional analysis facilitates iterative processes of requirements for expected products. However, this often leads to higher budget requirements, as the process can become rather expensive. Another consequence of this is the time limits for the products are often exceeded. In order to meet deadlines and budget restrictions, processes are often speeded up resulting in a lack of quality and efficiency.

In this paper, we propose the use of knowledge management as an efficient way of dealing with these problems. We will define several characteristics of knowledge and their applicability in the context of the Requirement Engineering field and the knowledge problems within the field. The approach described in this paper is being developed within the ESPRIT project KARE.

12 Industrial End-User Requirements for Requirements and Knowledge Management Tools

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Abstract:

Abstract:

The KARE project, which started in September 1998 and will finish in February 2001, aims at the development of a systems engineering workbench, a set of ISO standards, and education material related to the previous two topics. During the first phase of the project, workbench requirements where generated by the KARE industrial partners. These requirements are based on their past experience with requirements and knowledge tools and are formulated from an industrial end-user perspective. The paper will discuss these requirements, explain their background and thus contribute to a general discussion on the anticipated use of such system engineering tools.

Keywords:

KARE, Systems Engineering, Requirements Management, Knowledge Management, Tools

13 ProRad: Professional Rapid Product Concept Development Tool

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Abstract

The ProRad project is an ESPRIT project (29124). The consortium is made by the following partners: Cap Gemini Innovation, France (C) ; Fhg-IAO, Germany (P) ; IAT, Gemany (A) ; IVECO, Italy (P) ; AUSA, Spain (P) ; ICT, Spain (P).

ProRad is a new scenario and information management tool for the development of innovative vehicle concepts.

Keywords

Information, data, communication, process

14 Decision Support Methodology for Early Decision Making in New Product Development — A Case Based Reasoning Approach

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Abstract

Abstract

A decision support environment aimed to help project managers and design engineers in early stages of product development is proposed in this paper. The research is in the framework of CODESCO - Communication and Decision Support Environment for Managing Concurrent Engineering. A practical methodology for computerised decision support is proposed in this paper. The focus will be on the research carried out to date towards developing a knowledge-based system using the Case Based Reasoning (CBR) approach. We shall describe the generic decision process and how decision data is represented in cases, a typical 'what-if' scenario, which applies CBR in order to study the downstream effects of proposed changes to product specification. The paper concludes by discussing the issues that emerge from this type of approach.

Keywords

New product development, Decision making, Case Based Reasoning

15 Knowledge-Based Enhancements to Product Data Server Technology for Concurrent Engineering

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Abstract

Many requirements to product data technology for concurrent engineering can be most efficiently satisfied through the application of advanced client/server architectures enhanced with appropriate knowledge-based methods. This paper outlines the basic design considerations for a knowledge-based product data client/server system and suggests a development approach on the example of a prototype server implementation realised in the domain of architecture, engineering and construction (AEC).

Keywords

Concurrent engineering, knowledge-based system, C/S system, product data technology, IFC project model

16 Furniture Commerce Electronically Assisted by Way of a Standard-based Integrated Environment - the ESPRIT funStep Project Proposal -

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Abstract

Nowadays, one of the primaries problems in the information management domain that industrial companies have been observing and intend to solve soon are those related with the automatic exchange of information among their applications within corporation as well with third parties related with their business.

The ESPRIT 22056 funStep project has addressed this problem developing a ISO10303(STEP)-based environment for the manufacturer-customer integration in the furniture industry, suitable to be used by others industrial sectors.

Provide a set of mechanisms that speed up the integrator's tasks, facilitating the generation of interfaces and avoiding development errors, is imperative in order to achieve integration results in a competitive time. This time reduction is essential because company's needs are constantly changing which renders unacceptable the spending of a large amount of time in integration.

The use of standards in the modelling process can avoid the development of a high number of interfaces and extend the lifetime of the whole system. In time, as the commercial tool's builders absorb these standards, the effort needed to keep the global system updated will be reduced, as well as the number of different product data libraries (e.g. product catalogues).

This paper describes the contribution of funStep project on this area, presenting the implemented architecture to support furniture commerce electronically assisted by way of a standard-based integrated environment, regarding the integration and compatibility aspects between software applications and Product Data libraries.

17 The IT integration supporting the Extended Enterprise

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Abstract

The European AIT initiative (**A**dvanced **I**nformation **T**echnology for the European manufacturing industry) has defined an IT Reference Model, in which the "Integration Platform" supports the interoperability between all the business applications covering the complete product lifecycle. This open platform integrates the different actors of the extended enterprise, helping them work together, as well as data and processes.

Based on the user requirements, some AIT projects (R&D) contributed to the integration of CAD/CAM/CAE in the heterogeneous IT environment for the enterprises of the aerospace and automotive industries.

This paper reports about the results of the AIT-IP project in charge of the specification of this integration platform, and the experience gained in prototyping on object oriented technology and standards (STEP, CORBA, Java, Internet, …). It describes the main components and services specified, and presents what was partly implemented for demonstration purposes, in the domain of design and manufacturing, according to users' scenarios. Some performance aspects are also addressed, with the help of adapted monitoring tools.

Finally it presents an overview of the future in "plug & play" CAD/CAM products expected by the users, with the selected standards allowing a short term implementation, and different running projects of the neighbourhood.

Keywords

Integration, extended enterprise, standard, interoperability, compliance

18 From Product Data to Product Data and Knowledge Management - Requirements and Research Perspective

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Abstract

As a subgroup within the Esprit Working Group 21108, Integration in Manufacturing and Beyond (IiMB), the authors are concerned with the management of product related data and knowledge in the extended enterprise considering the paradigm of the learning organisation. The focus of the work is on concepts, approaches and methods for capture, maintenance, management and use of data and knowledge about products covering the whole life cycle from idea generation, via product and process design to operation and recycling of a product. This working paper reports on our current understanding of the problems and requirements of product data and knowledge management in the extended enterprise.

Keywords

Product data, knowledge management, extended enterprise, virtual enterprise

19 A practical approach for Rapid Implementation of PDM in SME's

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Abstract

Product Data Management (PDM) systems manage and support the flow of product and process related data during the entire product life cycle. The RapidPDM project aims to develop innovative methods and tools that make faster, easier and more effective implementation of PDM possible. The RapidPDM project focuses on discrete manufacturing (both mechanical and electrical) industry.

The project started as of September 1st , 1998 and will deliver a first trial release of methodology and tools in the fall of 1999. The presentation at the ICE 99 event will present initial results of the project and will also elaborate on issues and problems encountered so far. We expect that discussion with fellow researchers, developers and industry people will help solve some of the issues encountered and will give guidelines for further activities within the project.

Keywords

PDM, implementation, RapidPDM, process modelling, product data modelling, business process reengineering, engineering process simulation, return on investment, ROI

20 Capturing and Modelling Engineering Knowledge for Use in KBE Applications

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Abstract

Increasing numbers of knowledge-based engineering systems are being used in the aeronautical and automotive industries. Experience has shown that there is a need for a systematic methodology covering the development and maintenance of such systems. The MOKA project is intended to satisfy this need by providing both a methodology and a supporting software tool, both of which are independent of any knowledge-based engineering package. The aim of this paper is to describe the context, progress and expected results of the MOKA project, with particular emphasis on the capturing and modelling of engineering knowledge. Further information about the project may be found in [Oldham et al, 1998].

Keywords

Knowledge-based engineering, Lifecycle, Methodology, Knowledge Modelling

Section 3 – Concurrent Engineering and the Extended Enterprise

21 Concurrent Engineering: Esprit-supported R&D projects in a world-wide context

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Abstract

The European Union has been supporting Concurrent Engineering (CE) related work since the beginning of the Esprit programme in 1984. CE became a formally supported R&D subject when it was described in the 1991 Esprit call. From this point on the words 'concurrent engineering' were used in many project descriptions. In a recent search on the CORDIS database, 43 projects across all programmes having CE in their project descriptions were completed and 49 were still in execution. A substantial number of these projects have a relationship with very specific industrial areas.

The analysis demonstrated a progression of EU support focus, moving from the development of tools to the implementation and the deployment of tools. This progress positions EU supported research to address the high leverage area of supporting organisational changes that realise the benefits of CE. The analysis was briefly compared with national programmes in US and Europe. This provided useful insights in the trends of CE R&D.

Keywords

Concurrent engineering, European Commission, Esprit, research and development

22 CE-NET: The initiative towards the Concurrent Enterprise Foundation

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Abstract

This paper describes a set of expectations, visions and achievements in establishing the foundation of the Concurrent Enterprise as a result of the CE-NET initiative over the last 18 months. It provides an historical path of the Concurrent Engineering NETwork of Excellence (CE-NET) activities conducted during meetings, workshops and conferences as well as an illustration of the different CE information databases for existing CE related projects, CE tools and Who's who in CE. The two major CE-NET targets that constitute "Concurrent Enterprising" and "R&D Support Network" are briefly explained. It also presents the future activities for the next 6 months and introduces the CE-NET second phase challenges within the next Millennium.

Keywords

Concurrent Engineering, Virtual Enterprise, Electronic Commerce for Collaborative Business

23 Approach and Concepts for a Methodology and Software System for the Implementation and Improvement of Concurrent Engineering in Small and Medium Enterprises in the Aeronautics Industry

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Abstract

Concurrent Engineering (CE) is widely accepted as an effective approach to new product development practices. Large organisations in the aeronautics industry have already committed themselves to CE and have achieved a high level of implementation. In small and medium enterprises (SMEs), however, the situation is heterogeneous and further support for implementing and improving CE is desired. The CEPRA project aims to develop an electronic consulting system supporting these SMEs on their way towards CE. The system comprises three modules: An Assessment Module evaluates a company's CE practices and identifies weaknesses. A Solution Identifier Module presents potential improvements and existing solution cases addressing these problems. Finally the Tool Selection Module suggests methods and tools which can assist in the implementation of the solutions. The paper outlines the current state of the art of CE in SMEs in aeronautics. It describes the approach and findings from capturing the user requirements and presents a draft architecture of the CEPRA system.

Keywords

Concurrent Engineering, Methods, Assessment, Solutions Cases, Tool Selection

24 FREE Fast Reactive Extended Enterprise
The Results

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Abstract

The development, production and support of industrial products is more and more often realised by a group of companies, together forming a consortium, each with its own expertise applied for performing a set of allocated tasks in using its own way of working. By concentrating on core-business, each individual company becomes more competitive. Moreover whether a specialised company will survive, heavily depend upon the effectiveness and efficiency in operating within such a consortium. There are different economic motivations that justify this trend. SMEs are particularly motivated to access a larger market by being selected within such project consortia. It also contributes to reduce both the economical and technical risks.

In this paper, the current co-operation is set and also future trends are explained. It answers the question: *how to improve collaborative work between trading partners* by using the results of the FREE project.

Keywords

Virtual organisation, Organisational arrangements, communication, collaboration

25 Evaluation Of Design Manufacturability In Extended Manufacturing Enterprises

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Abstract

The paper reports on a new theoretical platform and pilot environment for rapid distributed product design in extended enterprises using collaborative, autonomous design and manufacturing agents. The approach is based on exchange of requests and information between design and manufacturing evaluation agents. The decision making on design manufacturability is based on using multilevel resource models to describe the exclusive and shared capability boundaries between different manufacturing resources. The reported research aims to provide the designers with a rapid manufacturing feasibility assessment tool to be used at different design and planning stages in extended manufacturing enterprises.

Keywords

Manufacturability, Extended Enterprise, Design Evaluation, CORBA

26 An Implementation Template to set up Concurrent Engineering Projects in the Defence Supply Chain

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Abstract

Because of the high cost and complexity of the tasks necessary to design and manufacture a complete aircraft or weapons system, aerospace companies have been merging their resources. At the same time, there has been an increase in outsourcing components previously made in house, in line with core competencies.

To improve their new product introduction process, aerospace companies have been moving to form integrated product teams. Where significant components are outsourced, the suppliers' expertise should be harnessed. The industrial problem is how to do this effectively in a manner that benefits both customer and supplier (the "win-win" solution).

This paper reports on the development of a CE project implementation template to help producers and designers to work together in the best way to improve the producibility (or manufacturability) of parts. Details of producibility interaction mechanisms have been defined. These are currently being tested in a 'live' product development project in the defence industry.

Keywords

Producibility, Template, Concurrent Engineering, Extended Enterprise, Defence

27 A Model of Lean Production Information Connections

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Abstract

The article presents a model of information connections in a small-series production company. The model is based on the principles of LEAN production and it contains the elements of concurrent engineering. The article explains the basic differences between serial and concurrent engineering and describes the basic steps in establishing the system of concurrent engineering, the emphasis being on team work and development of »3-T« loops. Furthermore, information system (IS) in a 3-T production planning loop is presented in detail, as well as the implementation of the IS with low-cost information technology (IT) tools, such as Internet and Intranet.

Keywords

Concurrent engineering, information technology, LEAN production, product realization process loops, team work

28 Innovative SMEs in the Automotive Supply Chain; Issues for Concurrent Engineering

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Abstract

This Paper sets out a case for presenting a working definition of "innovation" in relation to Small and Medium Enterprises (SMEs) in the automotive manufacturing sector. A review of published work to date on the concept of innovation applying to small manufacturing firms will be presented and a critique of methodologies and consequent "models" will be made.

The Paper will focus on the automotive manufacturing sector in the West Midlands region of the UK and describe the methodology underpinning the development of an innovation audit tool and the application within the context of a process consultancy/research approach to a group of SMEs within the West Midlands.

The Paper concludes with a report on findings to date and a discussion on the future direction of the research and issues around collaborative working.

Section 4 − IT Supported Multidisciplinary Working Environments

29 Distributed Architectures And Components For The Virtual Enterprises

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Abstract

A comprehensive solution for enterprise information systems, access to technical or business information, and electronic publishing and commerce for the concurrent enterprising of tomorrow, requires the integration of new sophisticated technologies and systems. This paper presents the research and results achieved in the framework of the VEGA project, establishing an infrastructure supporting the technical and business operations of virtual enterprises, with workflow tools and distributed architectures developed in compliance with product data technology. The VEGA objective is a platform enabling companies to work together, and being the basement for future integration and distribution of business components as promoted in the WONDA project. The WONDA main goal is to specify a scalable 3-Tier component-based architecture for secure and sophisticated access to versatile information systems and electronic content. This paper, which reports on the VEGA's story and introduces to some WONDA concepts, provides a limited picture of the overall objectives and results achieved in this still experimental area, and should be an incentive for the reader to go further into the projects achievements.

Keywords

Product data modelling and STEP, CORBA-based middleware, Workflow, Business objects and components.

30 COWORK: IT Tools to Support Concurrent Project Development in networks of SMEs

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Abstract

This paper is aimed at presenting rationale and objectives of the ESPRIT project EP 25360 – COWORK "Concurrent Project Development IT Tools for Small and Medium Enterprises Networks", which is under development within the Integration in Manufacturing Domain. Its ultimate goal is to develop a new software tool enabling Small and Medium Enterprises (SMEs), working in the mechanical sector, to co-operate in a distributed engineering environment to dramatically save time and reduce product engineering costs. This objective may be reached by encouraging SMEs enterprises to systematically apply Concurrent Engineering and Co-design techniques, duly supported by a new specially-conceived software.

This software package will manage all the engineering phases even in heterogeneous environments and in different geographical locations, as it happens to SMEs that subcontract vital or important subsystems or components to external suppliers, on which they do not have any strong negotiating power; the software will be integrated with the main CAD systems commonly found on the market and will simplify and automatize the exchange of information, thanks to product and process models with high semantic content; the Internet technology will represent the basis on which to build communication.

Keywords

Virtual Enterprise, Concurrent Engineering, Product Data Modelling, Groupware.

31 Concurrent Operation Project:

IT Infrastructure and Man Machine Interface for a Full Company Integration

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Abstract

About two years ago a re-organisation project, named "Concurrent Operations", has been activated within the Alenia Marconi Systems / Naval System Division, having the purpose to realise co-operative working procedures throughout all the business processes, to make group working possible by overcoming time, space and organisational structure boundaries and to orient Company procedures towards CALS strategies.

In order to reach these goals and carry out a virtual integration of a given number of people, in addition to the revision of the main organisational aspects, the Concurrent Operation project has defined and implemented an Information Technology Infrastructure and a Man-Machine Interface that will allow to use all the software applications necessary for an efficient management of the business activities, according to the GroupWare paradigm.

This document intends to describe the design modalities of the I.T. architecture and the Man-Machine Interface called "COIN" (Concurrent Operation INterface).

Keywords

Groupware, Virtual, Team, Concurrent

32 Mobile Telepresence Services for Virtual Enterprise

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Abstract

The advantages of contemporary communication and information technologies based on virtual reality techniques offer for companies a totally new approach to cooperation. Use of virtual product models can be extended to product development, manufacturing, marketing, customization and selling of products for Internet based virtual enterprises. The presentation addresses how the virtual product models and personal mobile telepresence may be utilized as means of communication between product design, manufacturing, marketing and sales.

In this paper we offer an approach to adding aspects of distribution, mobility and augmented reality to telecooperation in virtual enterprise, discuss the technology and potential future product concept vision, the *Cyphone*, and some user scenarios and potential services. Finally, a survey about relevant telecooperation services is presented. In addition to various telepresence based services also several augmented reality based services has been identified with potential to enhance groupwork in co-located teams.

33 Establishing Intelligent Electronic Marketplaces Through Global Engineering Networking, GEN

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Abstract

This paper presents the GEN approach for building-up global electronic marketplaces for engineers. GEN enables large-scale and SME like companies from different sectors to use and exchange engineering information and services in enterprise networks. GEN is being developed and piloted in a number of (EU-) part-funded projects (e.g. MATES, GENIAL, PROCAT-GEN). The MATES project augments the GEN information services by means of tools for collaboration amongst the partners, customers and suppliers involved in an engineering project. GENIAL and PROCAT-GEN support the access to information and services, which are stored in computer systems. GENIAL develops tools for intelligently accessing, inserting and administrating the information. PROCAT-GEN prepares the content for GEN, by means of on-line product catalogues.

Keywords

Electronic business, Web-based distributed engineering, collaboration support, digital product catalogues.

34 Workflow/Processflow technology for supporting Concurrent Design Processes

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Abstract

This paper addresses an original Concurrent Engineering implementation based on the Workflow/Processflow technology. This emerging Processflow technology, characterised as a flexible Workflow, is aimed to support technical processes addressing all the people involved in the development of a product. The approach considers a new way to provide the necessary improvements on multidisciplinary concrete work and tasks co-ordination. The resulting concurrent design process based on the workflow technology was validated on the basis of an industrial application.

Keywords

Concurrent Engineering, Processflow, Workflow, Co-simulation

35 Overview on COSMOS, an integrated design environment for plastic injection moulds.

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Abstract

As the injection moulds market increases, especially due to the increasing use of plastics in the automotive industry, Time To Market and cost reduction will be important aspects that mould maker must consider. The main and central objective of the proposed project is the development of an integrated product/process engineering design platform based on 3D CAD, advanced CAE/CAM systems, Product Data Management strategies and support methodologies for an efficient injection mould design, in order to: reduce the TTM, improve and facilitate Concurrent Engineering, improve the estimation of the characteristics of the products in shorter time. It is expected that the utilisation of the COSMOS project results will lead to a reduction of the TTM of about 30% and Costs of about 40% compared to the traditional injection moulds design and manufacturing case.

Keywords

Mould, design, CAD, CAE, integration

36 An Approach for a Practical Communication System for Supporting and Managing Concurrent Product Development

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Abstract

The changing business and competitive environment requires firms to introduce new products more frequently and in shorter time. This sets high requirements on the product development process of companies. Therefore, an efficient environment for product development is required. For such an environment an information system is needed, which comprises methods and software tools for communication. The authors will present an information system which supports such an environment with dashboards as central elements of a team information system.

The paper will outline existing approaches for information and communication systems in product development and will summarise their potentials and drawbacks. It will describe the methodical approach taken and will show examples of communication models. The concepts for the support environment will be described and a prototype of the software system which is currently being implemented will be presented.

Keywords

Communication, Concurrent Engineering, Data Management, Information Technology, Intelligent Agents, Product Development

Section 5 – Virtual Working

37 Web-Enabled Enterprising – New Requirements for Web Tools

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Abstract

Possibilities of web-enabled functional 3-D product models, i.e. so called virtual prototypes, in business activities are reviewed. Some business tasks where virtual prototypes could be beneficial are considered. Existing 3-D design and virtual world authoring tools cannot cover specific requirements set by different business operations. The tools are either too generalised or specialised for wide adoption. Based on these considerations and the work with industrial partners, the need for a new class of professional web tools that could help the adoption of virtual prototypes for different business activities from product development to customer support is identified. The work is demonstrated by a case study in which a tailored web page using virtual product models is developed for product marketing. The implementation is based on VRML 2.0 and Java.

Keywords

Virtual prototyping, functional product model, 3-D, visualisation, simulation, VRML, Java, e-business, internet intranet, world wide web, business processes.

38 Business Driven Design of Telematics Services

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Abstract

Companies function within a complicated context of multiple suppliers, ever more demanding customers, financial institutions, tax departments and so on. In their relation to others, companies require cost-effectiveness, quality of service and flexibility in products and processes. Telematics services applied in networked enterprises help to fulfil these requirement and are in fact indispensable.

However, for effective use of new telematics services between companies, cross-company co-operation should be well-defined and aligned with the internal business processes. We suggest an approach that allows for flexible integrated modelling, analysis and deployment of telematics services and (electronic) transactions within networks and chains of organisations. This approach stretches from the definition of cross-company co-operation to the actual implementation within a single design paradigm. Re-use of knowledge, implementation components, and best practices is an element in our approach.

Keywords

Networked enterprises, telematics services, component-based design, business modelling.

39 Can Business Process Engineering be Extended Towards Business Network Engineering?

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Abstract

Concurrent enterprises and networks of business processes cannot function without each other. Co-operation in networks allows for faster reaction to business opportunities, greater market coverage and increased operational efficiency, which in combination is not easily copied by competitors. Co-operation requires that the business processes within and between companies are well-aligned with the demands their environment puts upon them. This requires a careful and effective analysis of business processes from a customer-to-customer perspective. Moreover, the introduction of new information technology (IT) for effective business network operations and co-ordination will only function in a predictable way when one has an accurate (design) model of the interaction and co-operation in the network. Therefore a good model is essential. In this paper we show how modelling and analysis principles we developed for business process engineering can be used in business network engineering. We introduce a visual design studio developed for this purpose. This visual design studio enables business process engineers to capture and analyse both structural and behavioural aspects of (networks of) business processes in terms of models without having to actually build these processes first. Models created with this visual design studio can be analyzed and reconfigured on the basis of various business scenarios and perspectives and/or new technological possibilities. In the same way the strategic benefit of IT for business networks can be analysed and demonstrated. The tool studio is supported with a handbook containing methodological support for this (new) engineering discipline. We conclude with a discussion on the limitations of extending business process engineering towards business network engineering.

Keywords

Business processes, business networks, business modelling & analysis, information technology.

40 Electronic Commerce for Programme Management Information Sharing in the Concurrent and Virtual Enterprise (EPICE): Opening Up the Black-Box

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Abstract

Virtual or extended enterprising is a well documented way of working for global companies collaborating on large-scale complex projects in one-of-a-kind environments. The activity of Programme and Project Management in VE is not problem free, for it has to address in an explicit and transparent way the linked issues of security and trust. The EPICE project addresses emerging needs for the efficient and effective sharing of programme management (PM) information in the context of virtual or extended enterprises. It does this by developing tools which will enable project managers to maintain the flexibility to trade-off effectively. In order to do this project managers require consolidated information: live, real-time data collected in real-time from existing databases gathered and made available to partners in the virtual enterprise.

Keywords

Programme Management, information sharing, virtual enterprise

41 Smart Integration of Intellectual Property Rights Management in Business Processes

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Abstract

With the emergence of new technologies securing core business on the Internet, electronic commerce of intangible goods is becoming more and more a concrete business. Although the technology now provides mechanisms for securing payment and ensuring privacy, many content providers are still reluctant to deliver their content in electronic form. Many SMEs still fear to share their assets with other collaborative organisations within Virtual Enterprises. Existing Internet security technologies can be organised in such a way that IPR management is transparently integrated into business processes within a virtual enterprise in accordance with the applicable laws. This communication presents the main findings of the CIREP project, especially the CIREP methodology that assist SMEs in the deployment of an electronic trading platform for interoperable exchange of component information that also provide an infrastructure for collaborative work on networks. These findings are reused by the EPICE project to build the protection profile that is required to deploy a trustworthy distributed programme management information via a virtual project office.

42 Developing a Model for a Concurrent Engineering Simulation Game

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Abstract

Many tools support the implementation and operation of Concurrent Engineering. Human competencies such as teamwork, co-operation, customer orientation, and entrepreneurial thinking are gaining more and more in importance. However, traditional learning and training concepts in universities and industries do not address these human competencies. Experimental learning by simulation games appears to be a promising approach to overcome limitations of traditional learning and training concepts. The development of the underlying simulation model is a tightrope walk between the need to be close to the reality of the learning subject and the requirement to create an entertaining educational game. This paper gives a first insight into the development of a computer based simulation game, where a group of users will act as employees of a product development team.

Keywords

Concurrent engineering, education and training, simulation game, communication and co-operation.

Section 6 – Human Resource Management: Training & Teamworking

43 Concurrent Learning in Virtual Organisations

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Abstract

Learning is a continuous process that does not come to an end when one leaves school or university. In case of virtual organisations, it is important that the personnel from different local entities that are linked together shares the same knowledge, at the same level, and updates the knowledge consistently and permanently.

The paper presents a cooperative distributed learning system and shows how the facilities provided by the system make it well fitted for continuos learning in virtual organisations. The architecture of the system is a multi-agent one, human and artificial agents collaborating together to achieve the learning task.

The development of the system was triggered by the necessities of training both developers and users of high-performance computing in the framework of the CoLaborator project. A case study in this domain is presented to highlight the facilities of the environment.

Keywords

Distributed cooperative learning, intelligent agents, CSCW, high-performance computing

44 Toward a Human Factors-focused Modelling Framework for Teambuilding in Concurrent Enterprising

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Abstract

The paper discusses some key issues concerned with a new Human Factors focused Modelling Framework (HFMF) used for Team building within Concurrent Enterprising. The four basic dimensions of HFMF are : Mission Definition (Functional), Knowledge Based Agents Assessment (Structural), Team Building Environment (ICT-platform), Agent-based Market-like Modelling (Behavioral). A first Romanian pilot project, World-Bank funded, FABRICATOR (Virtual Enterprise based on Intelligent Agents, Object-Oriented technologies and Concurrent Engineering IT platforms) is briefly presented.

Keywords

Concurrent Enterprising, Extended/Virtual Enterprise, Concurrent Engineering, framework, Human Factors Modelling

45 Becoming a Virtual Manufacturing Enterprise: A Process for Building and Leveraging Organisational Competencies

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Abstract

It is widely accepted that effective competence analysis and management are critical activities for achieving competitive advantage in a dynamic business environment. However, a detailed understanding of the issues associated with the identification and management of organisational competencies is still missing. This paper proposes an initial process for understanding the identification and management of organisational competencies. Competence-based theory relating virtual organisations is critically evaluated. The need for competence management tools is highlighted and a competence management process is proposed. The process contains four key activities namely: competence identification, competence development, competence leverage and competence protection.

Keywords

Technology Management, Competence Management, Virtual Enterprises, Competence-based Strategy

46 New Ways of Learning and Training in a Model Company

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Abstract

The paper is based on the approach, that adequate qualification has to be developed by practice and training of "critical situations". Addressing these needs, the paper describes the idea to use a model company to provide a realistic environment for CE-training where critical situations can be simulated by adequate scenarios. It gives a short overview on qualification demands for concurrent engineering (CE) and distributed co-operation and describes the motivation, the initial concepts and first results of the utilisation of the training concept.

The training concept is subject of the European research project GLOTRAIN ("Training engineers for mastering new requirements in globally distributed manufacturing"), partly funded by the European Commission (Leonardo da Vinci project no. D/96/2/0788/PI/II.1.1a/FPC).

Keywords

Training concept, games, concurrent engineering, education and training

47 A Simulation Game for Concurrent Engineering: Determining Academic and Industrial User Needs

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http://www.biba.uni-bremen.de/projects/cosiga/

Abstract

Abstract

This paper describes the rationale and origination of a multimedia computer based simulation game of concurrent engineering for use on university engineering courses and for the training of engineers in industry. The paper describes the need and requirements for such a game. It also describes the methodology and results of the analysis of academic user needs. This included interviews and focus groups with users and players of the simulation. The learning goals for the simulation were developed from this analysis. The game will aim to realistically simulate the collaborative and co-operative process of product development inherent in a concurrent engineering approach. This two year project will make the final simulation game available on CD-Rom (with a demo version available on the internet) for use by other universities and industrial companies.

48 The Virtual Project
Managing Teams in Distributed Environments

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Abstract

Global competition is forcing businesses to rethink their work practices in response to demands for shorter time-to-market, enhanced quality and flexible adaptation to varying client requirements. This calls for concurrent work practices, teamwork and distributed operations. ICT developments are challenging collocation practice towards the virtual team scenario which cuts across functional, organisational and local boundaries. Globalisation adds national, cultural and linguistic diversity. European R&D projects are typical examples of virtual collaborations. A recent survey carried out amongst project managers of 50 EU-funded R&D projects provided interesting feedback that should stimulate further investigation of the virtual project scenario as a model for new ways of working in the virtual enterprise. The paper outlines the trends in collaborative work and the particular challenges to managing virtual teams.

Keywords

Project management, virtual project, distributed teams, virtual teams

49 Managing Concordance and Knowledge in Virtually Collocated Design Teams

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Abstract

This paper explores the evolution of virtual collocation of product design teams within the context of concurrent engineering (CE). It presents selected results from a set of on-going pan European projects as well as other investigations undertaken by the authors. It reports that concepts of teaming have been around for many decades, however, virtual teaming especially within the context of CE is a relatively recent phenomenon. Arguably, with the recent advancement and deployment of electronic communication the need to physically collocate the product design and development team has become less prevalent, however, the implications of virtual working are not illustrated or experienced extensively.

In this paper it is argued that design activities have implications for people and structures within and between trading organisations. Attempts are made to highlight paradoxes and dilemmas in setting up physically and virtually collocated teams. These issues are further explored via case studies depicting product design and development activities in manufacturing organisations. The latter part highlights and further debates pertinent issues that require addressing when establishing collocated teams and this is followed by a number of questions for future research activity. The authors conclude the paper by proposing a generic framework for organisational knowledge warehouse as well a model depicting pre-requisites to culture of concordance model.

Keywords

Collocation (physical & virtual), Concurrent Engineering, Product Design, Teaming, Concordance, Knowledge Management & Diffusion

Section 7 – CE Experiences & Case Studies

50 Characteristics of Networked Enterprise in Global Construction

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Abstract

In exploring characteristics of Networked Enterprises in global construction this paper builds on the findings of the ESPIRITE 20876 project 'eLSEwise' about the current and future Large Scale Engineering industry. It discusses how accelerated changes in the business environment and technology are transforming the structure of the Virtual Enterprise in construction and ways in which it operates. It describes drivers for change and explores how they will shape the future Networked Enterprise. The paper also addresses potential benefits of such an organisation, and potential barriers to make real opportunities provided by the new technologies. Special consideration is given to the issues which are particular to construction.

Keywords

Networked organisation, project virtual enterprise, large scale engineering

51 Internal Drivers for Concurrent Engineering Industrial Case Study

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Abstract

The external drivers for change in the product development process, and the general fundamentals of Concurrent Engineering (CE) are well established. However, implementation of CE has faced many problems and many attempts have been unsuccessful. In order to successfully implement CE, the organisation has to understand, accept and fully participate in this process.

This paper presents an industrial case study, which used an internal company survey as a mechanism to establish prioritisation of CE implementation levers, and establish an effective buy-in from the people involved. The aims of the survey were: to find out what stops people doing their jobs now, and what could be done to improve their jobs in the future. The results show that nearly 70% suffered from internal delays within the engineering department, and nearly 50% suggested that the way to improve their job role would be to have more involvement in the project at an earlier stage, allowing early buy-in and correct prioritisation of implementation duties.

Keywords

New Product Introduction, Concurrent Engineering, Internal Survey, Improvement Methods

52 Product Data Management at ASML

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Abstract

In 1993 ASML started with 3D-CAD, followed by the introduction of Integral Product Data Management (IPDM) in 1994. To successfully implement IPDM means and methods, ASML has worked on at least three things. Firstly an IPDM philosophy including a practical implementation strategy was required. The ASML philosophy can be described as "short term solutions with a long term in mind". Secondly, a supporting IT infrastructure had to be in place, which required decreasing the number of local PDM-systems, followed by the implementation and integration of new PDM-systems. Finally, a clearly defined, unambiguous product model had to be defined, built and maintained during the complete life-cycle of a product.

Keywords

PDM, IPDM, ASML

53 New Product Introduction - The Triangulation Tools for Time Compression and Competitive Advantage - A Process Industry Case Study

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Abstract

'The way leading companies manage time - in production, in new product development and introduction, in sales, in distribution - represents the most powerful sources of competitive advantage' George Stalker (1988).

New Product Introduction is a vital process (Dimancescu, Hines and Rich, 1997) for most organisations. If Stalkers proposition is correct then the focus for improvement in this process must include time based methods. New Product Introduction is defined, for this case study, as the evolutionary process which enables an organisation to create many variants of a product or service. These products or services will focus strictly on the market segment that they intended to satisfy. An example of this type of process is the Sony Walkman (Dimancescu, 1994) which evolved over 10 years and had 180 variants. Where as, the best of its competitors could only manage to compete and produce 50% of the variants, hence Sony captured a greater proportion of the available markets.

Customers want products which exactly meet their needs (Womack & Jones, 1996). To achieve the range of product variants this will create, at a competitive price, ever shorter lead times are essential. This paper focuses on the operational characteristics of an organisation and the research undertaken in applying a set of efficiency tools and techniques in a multi-disciplinary arena. The tools and techniques concentrate on time to market and the strategic need of an organisation.

Building on the VALSAT approach (Hines et el., 1997, Hines et el., 1998) a series of tools and techniques (Fig. 2) have been identified which will theoretically help organisations visualise their order fulfilment process in a cross functional manner. The planned outcome of this research was to prove the use of the techniques for New Product Introduction and create a framework which could be transferred to other sectors.

Finally this paper will show the case study framework used by an organisation to achieve quicker and more effective processes. This will focus on waste elimination (Bicheno, 1994).

Keywords

New Product Introduction and Lean.

54 The Supporting Infrastructure for Global New Product Development

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Abstract

This report presents the results of the 1998 Global New Product Development Survey, carried-out by the Warwick Manufacturing Group at the University of Warwick (UK). The survey is based on a questionnaire addressed to 637 firms with turnover greater than £ 30 million ($ 45 million), operating in the UK across key industrial sectors and engaged in New Product Development (NPD). Response rate was of 8%.

The supporting infrastructure for NPD was investigated, including "hard" (tools and technologies) and "soft" (people-related) practices. The latter was found to be more important to NPD success and speed, such as the skills of project leaders and the effective delegation of tasks through formal NPD processes. Multinational teams were perceived to have a positive effect in meeting goals, trust and commitment. IT communication tools (e-mail and video-conferencing), followed by administration tools (project-planning and presentation software) are the main priorities in firms with widely distributed teams.

Keywords

Global New Product Development, benchmarking, information technology, organisational practices, teamwork.

55 Business and ICT Trends in the European Large Scale Engineering Industry

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Abstract

In recent years the Large Scale Engineering (LSE) construction sector in Europe has seen profound change. This is mainly due to increasing competitive pressures from the United States and the Asian Pacific countries which has led in turn to increased pressures to improve competitiveness, productivity and client satisfaction. Lack of understanding of clients' and contractors' requirements hinders achieving such goals especially with the increasing trends of executing LSE projects in a "virtual enterprise" environment. ICT (Information and Communications Technologies) vendors and developers also need to understand clients' and contractors' requirements of systems and to align their products to them. This paper reports on findings from studies undertaken within the eLSEwise (European Large Scale Engineering Wide Integration Support Effort) project to investigate the LSE industry requirements, and identifies gaps in the relationships of clients and contractors with other parties of the supply chain and in ICT provision.

Keywords

Large Scale Engineering, Information and Communication Technologies, Construction, eLSEwise

56 Concurrent engineering implementation as a strategic weapon: Japanese manufacturers' view

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Abstract

This paper describes Japanese manufacturers' evaluation on the relevancy of concurrent engineering (CE) and its related technologies. The data used for investigation are those provided by Japan Manufacturing Futures Project (MFP-Japan), which is a part of international-wide manufacturing strategy focussed survey. Analyses were performed through so-called gap analysis and correlation analysis by focussing on action programmes and strategic direction of manufacturers. Industry-wise analyses were also performed to discover the particular features of each industry's strategic behaviour, especially focussing on CE as a strategic weapon. Obtained result indicates that every emerging action programme including CE is losing its importance. On the other hand, linkage of these action programmes with companies' strategic direction diverges depending on industrial sectors. This means that the considered action programmes play some roles as strategic weapons.

Keywords

Concurrent engineering, Manufacturing strategy, Implementation, Manufacturing Future Projects, Gap analysis

57 Implementing Design and Manufacturing Advanced Technologies in a Concurrent Engineering Environment

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Abstract

In this article a Concurrent Engineering (CE) implementing project, in a Spanish medium manufacturer company, is described. The project is going to be a collaboration between a research group and a car manufacturer subsidiary. The final aim is to define a strategy, for small and medium companies, in order to change from the actual product development processes to a new integrated design and manufacturing environment. The project will be focused on the study of the design process and will make a proposal to define a CE environment for this company.

Our purpose is to try to demonstrate a methodology, developed at Jaume I University, which will orient companies in the reengineering process. The success of this project, and its application, will be key in the implementation of CE in Spanish industries.

Keywords

Implementing CE, process innovation, computer aided design and manufacturing, product data exchange

58 Design of target operation time by using Bayes formula: An approach for concurrent project progress management

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Abstract

This paper discusses about a management tool for effective project progress. Considered issue in this paper is a problem to estimate rational duration of each elementary operation for meeting final due completion time of a project. Decision tree analysis and Bayes formula were deployed for this purpose. The former is for deriving prior probability distribution of entire project duration and the latter is for calculating posterior probability distribution of each elementary operation for Just-In-Time completion. Some example calculations of the proposed procedure are given to demonstrate its relevance and it was clarified that this procedure provide a powerful support function for project planning and control activities in the context of concurrent progress management of projects.

Keywords

Project progress, Concurrent management, Bottleneck, Improvement, Bayes estimator, Decision tree

59 Using Metamodels for Modelling the Propagation of Design Uncertainties

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Abstract

In the early stages of the design process, the designer has only a rough knowledge of the form of the design. Many design parameters may only be known within a certain range. As a consequence, product functionality is uncertain, the degree to which specific product functionality contributes to meeting overall customer and other stakeholder needs is known only imprecisely, as are the needs themselves. Mapping these uncertainties into a resulting uncertainty in the design quality is difficult, because models of product performance can be complex and time-consuming to evaluate (e.g., finite element models). We use approximations to the product performance models (metamodels) to provide simple and computationally inexpensive tools that can be used to combine fuzzy characterisations of design parameter uncertainty and needs uncertainty into fuzzy characterisations of product performance. The methodology is illustrated for a desk lamp design problem.

Keywords

Engineering design, functional requirements, fuzzy set, metamodeling

60 Proposal of an Information System to Support the Manufacturing Preparation

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Abstract

In this study, we developed an information system to support the production scheduling, which is an essential part of manufacturing preparation. In production scheduling, routings for the processing of each assembly part as determined in process planning are compiled to determine the sequence of the tasks. Here, improvements in production efficiency and the meeting of deadlines are required. But, the plans must be reevaluated every time changes are made or unexpected tasks are added. Hence, the average lead time from design to manufacturing is long. In the present study, an information system model designed to overcome this problem was developed and applied to sheet metal processing in which a Numerically Controlled Turret punch (NCT) is used. The information system developed could be a useful tool in the decision support system for production scheduling as well as decreasing the lead time for design and manufacturing.

Keywords

Manufacturing preparation, decision support system, information system

61 Technological-Functional Engineering of Advanced Materials Products

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Abstract

Globalized economy, which is characterised by competitiveness and quality, determined the appearence of a large range of techniques and methods, necessary in order to solve the problems that appear during the development process of advanced materials products.

The present paper proposes a method called Technological- Functional Engineering (TFE) as a new methodological structure for solving these problems, reconsidering the defining characteristics of the product, including the material.

TFE acquires a bigger flexibility, using a method of relational fulfilling ,of inteligent manufacturing and functional conditions of product made from advanced materials.

The aim of this method is to give up at the fix aspect of the characteristic of the material and using a simultaneous approach of the functional and the technological component, a reconsideration of this aspect by interference with other defining characteristics.

The solution offered by TFE represents a new optimal and modern modality of reaching the economical efficiency in an economical globalized systems objectives.

Keywords

Technological-functional engineering; functional conditions; advanced materials.

Section 8 – Additional CE Related Activities

62 Modelling the Dependency Structure and Optimisation of Concurrency in CE

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Abstract

Early involvement of tasks in a New Product Development (NPD) process will increase the complexity and the amount of information flow. Using technological solutions and advanced IT facilities have had a significant impact in faster interactions and better management of such information flow. However, the human-centred approaches of Concurrent Engineering (CE) such as organisational changes, teamworking etc. provide the most challenging and also the most effective solutions for this integration. This paper discusses the requirements for optimal concurrency of NPD stages and investigates the suitability of some modelling techniques for management of such concurrency. The research focuses on applicability of Design Structure Matrix (DSM) in modelling the information flow and in optimisation of concurrency in a CE project. New algorithms and software for DSM modelling are also introduced.

Keywords

Concurrency, Task Dependency, Design Structure Matrix (DSM), Information Flow.

63 Management of the Human Factor in Concurrent Enterprising: Lessons from an Organisational Culture Perspective

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Abstract

An analytical model of how to perceive the human dimensions of an organisation is discussed. The model shows how the human and cultural resources influence the efficiency of concurrent enterprising by focussing on the variations in world-view and goals of the collaborative efforts. This perspective on the practical analysis of the integration of organisational units represents a comprehensive and synthesising tool. The model is based on aspects of organisations' daily routines, and is as such easy applicable for analysing concrete organisational situations. The model presents a structuring of the various human resources inherent in the organisational heritage as well as in the strategic formulation of future goals. It discusses the importance of the human interpretation of organisational boundaries, and the consequences for implementation of concurrent enterprise projects.

Keywords

Corporate culture, concurrent engineering, human factor.

64 Multidisciplinary Co-Operative Product Development

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Abstract

This paper addresses the issues of generalised requirements for multi-disciplinary co-operative work environments, characterised by an intensive use of computerised support for the design and development activities.

The paper is based on the results from the CENTEX ESPRIT project Nr. 24118, devoted to the experimentation of an Integrated Collaborative Work Environment (ICWE) in HW and SW development.

Lesson learned from the CENTEX project are used to establish a set of requirements that are applicable to different product areas, and a reference architecture is provided, accommodating solutions in response to common issues for controlling multi-disciplinary development process, through the paradigm of dynamic work flow management, defined as a flexible Workflow management approach supporting iterative processes.

Furthermore, Industrial needs and readiness to the adoption of both advanced development tools (as Hardware/Software co-simulation) and innovative business process control tools are presented, as assessed through a dedicated market survey, the results of which are summarised in the paper.

Keywords

Concurrent Engineering, Processflow, Workflow, Co-simulation

65 Product Model, Decisions and Knowledge Base For Automatical Process Planning Systems

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Abstract

This paper presents the research of creating the methodology for modelling mechanical parts. In our research /1,2,5/, we were used parametric method in mechanical elements projecting in aspect of the projection and manufacturing. The primitives are the a base in the research and a base for procedure Primitives are the scope of geometrical parameters and are technologically oriented, connected with forms reaching all the information from the higher level. The model of the mechanical part is used as a base to create the CIM concept. The information, which is a part of the model is also the necessary entrance in each module of production system designing.

Keywords

Modelling, DLL, technological model, knowledge