Table of contents

Preface XI

Organisation XIII

1 Product modelling
Towards integrated construction technical documents — A new approach through product modelling
A. Mokhtar & C. Bedard 3

Managing design data: Including CAD in integrated environments
T. Liebich 11

Modelling of generic document structures and the development of an integrated document data environment
S. G. Armstrong & S. R. Lockley 19

Modeling and integrating design data from experts in a CAAD environment
P. C. Lockemann, J. Mülle, R. Sturm & V. Hovestadt 29

Building product model for life cycle applications
N. Kohler & J. R. Bedell 35

Requirements on standardised building product data models
M. Hannus, K. Karstila & V. Tarandi 43

Strategy for computer integrated design construction and technology
A. K. Munns, Y. B. Li & A. A. Lookman 51

Product modelling in CAD system for reinforcement design
D. Žlajpah, A. Knific, V. Ljubič & J. Duhovnik 59

Static models and dynamic designs — An empirical impasse vs an inductive solution
M. Ramscar 69

Metamodel for buildings
P. Richter & C. Richter 77

Representation of product data models that evolve during the design process
H. Werner & W. Kowalczyk 83
Concurrent knowledge based engineering: Strategic issues in product modelling for the construction industry
S. N. Papantonopoulos, R. P.G. Barlow & G. N. Fisher

Context-oriented modeling of Eurocodes
E. Condamin, R. J. Scherer, J. H. Garrett Jr & H. Kiliccote

Integration of models: From experience of GSD group to the definition of French reference models
B. Ferries, J. P. Bedrune, A. M. Dubois & J.C. Mangin

Product modelling for application
R. Junge, T. Liebich & E. Ammermann

Mappings: The glue in an integrated system
R.W. Amor & J. Hosking

Operation mapping or how to get the right data?
A. Bijnen

Modeling civil engineering constraints with inter-object relationships
A. Bergmann, T. Bode, A. B. Cremers & W. Reddig

A view-dependent model for acoustics in building design with a communication purpose
J.-L. Monceyron, P. Poyet & J. Beaumont

Hierarchical aggregation form of steel skeleton
M. Heinisuo & J. Hyvärinen

Feature based product model for steel structures
H.-W. Haller & H. Saal

Product modelling in steel construction
M. Huhn

Data exchange of 3D building models based on STEP
W. R. Haas

Relationship modelling in design of diesel power plants
P. Paasiala, A. Aatronen, K. Tanskanen & A. Riitahuhta

How can specifications be handled as entities and objects by computer?
P. Toms

2 Design process modelling
Resolving conflicts as knowledge evolves
I.F. C. Smith

Multi agent driven cooperative product development
H. Grabowski & R. Schreiner

Using self-organising objects for design
M. Hauser & R. J. Scherer
Site influence and rules for steel structures optimal design
*M. Sellami, A. F. Cutting-Decelle & -J.C. Mangin*

Fundamentals of optimal computer projecting of construction foundations
*V. P. Dyba, S. I. Evtushenko, V.V. Shmatkov & A. Y. Murzenko*

Product and process modelling of production and assembling of reinforcement
*B. Dolinšek & J. Duahovnik*

Simulation of the communication process
*B. de Vries & L. J. Somers*

The need and requirements for project performance models
*L. F. Alarcón C. & D. B. Ashley*

Modelling project team strategies in construction projects
*L. F. Alarcón C. & D. B. Ashley*

Activity models of the architectural design: Application to concurrent multi-engineering
*L. Adolphe*

A prototype tool to schedule and simulate the house refurbishment process
*C. Glardon, N. Kohler & Th. M. Liebling*

Document centered approach to design process modelling
*Ž. Turk*

Integration of project management system and object-oriented product model
*D. S. Tzanev*

3 Automation in construction and facility management

Minimal procurable units as objects in construction process modelling
*J. Bröchner*

Capturing semantic data in CAD for construction project planning
*J. H. M. Tah, R. Howes & P. Iosifidis*

A conceptual model of construction scheduling activity based on the application protocol format
*Q. Zhong, K. W. Tham & K S. Mathur*

A run time generation of construction plans: Integrating construction information model with building model
*M. Alshawi & Z. Hassan*

Development of a defect prediction prototype expert system for the housing industry
*Z. Ahmed*

Conformity control of building materials based on realistic stochastic models
*L. R. Taerwe*

Field support using mobile computing
*N. Diehl*
An automated meta-database system and its application in construction management 333
Li-Guo Wang & A. K. Munns

The application of an automated meta-network system in construction management 341
Li-Guo Wang & A. K. Munns

Evaluation of three different methods concerning the crane coverage problem 349
K. Lennerts, E. Gehbauer & L. Petersson

Sustainable information systems for project management 357
C. E. V. Thomas, S. P. R. Vincent & T. C. Cornick

STEP conforming integrated facility management 365
F. Cheng, P. Patel, F. Evans, S. Bancroft & E. Robbens

Object Manager - A CAE-tool for buildings in operation 371
U. Rüppel, U. Meißner & G. Nitsche

Software analysis of a flexible object-oriented facility management system 379
J.N.W. Bos

System analysis and design of a building product model for the total building management 387
K. Menzel

4 Integrated environments

Modelling requirements for integrated building design systems 395
M. Sun & S. R. Lockley

STEP-based information systems in integrated environments — A case study 403
S. Schwarz

Integrated predictive modelling — Strategic research programme of building research establishment 407
D. P. Bloomfield, F. Parand & F. Cheng

RETEX — A design environment to support integral design 413
C. Hertkorn & S. Heitz

The MARITIME AP Factory: A modelling environment for application protocols 419
W. de Bruijn, J. Høyte & C. Onneken

Product and process modelling in the OPTIMA project 427
F. Schmidt & H. Bach

Object-oriented data model in project OPTIMA 435
C. Volle & R. Rühle

Simulation-design — Operation of building HVAC-systems 441
G. Knabe & A. Rathey

Building management data acquisition using a product model based design process 449
M. Hinkelmann, M. Kopf & M. Madjidi

Broadband integrated communications for construction 457
A. Thorpe, A. Baldwin, C. Carter, D. Leevers & D. Madigan
5 European projects

The EU project ATLAS

ATLAS implementation scenario
R. Greening & M. Edwards 467

The ATLAS models
F. Tolman & P. Poyet 473

ATLAS integration tools
P. Poyet 479

The EU project CIMSTEEL

CIMSTEEL integration standards
A. Watson & A. Crowley 491

CIMSTEEL prototypes: 1 and 2
C. Fimbel 495

CIMSTEEL prototype: 3
A. Watson & G. Knowles 497

The EU project COMBI

EU-project COMBI - Objectives and overview
R. J. Scherer 503

COMBI: Integrated product model
P. Katranuschkov 511

COMBI: Knowledge-based tool for preliminary structural design
M. Hauser & D. Sandner 521

EP4.4 COMBI: KB-tool for foundation design
M. Mangini, G. Varosio & E. Parker 529

Project COMBI: Integrated structural analysis
B. Protopsaltis 537

The EU project COMBINE

An overview of the COMBINE project
G. Augenbroe 547

Conceptual modelling approaches in the COMBINE project

The COMBINE Data Exchange System
S. R. Lockley, W. Th. Rombouts & W. Plokker 567

COMBINE follow-ups
G. Augenbroe 577
The EU project ROCCO
ROCCO - Robot assembly system for computer integrated construction, an overview  
F. Gebhart & T. Bock  
A semi-autonomous vehicle for a mobile robot (ROCCO)  
Th. Bock & H. F. Steffani  
A fault tolerant assembly tool for the masonry robot system ROCCO  
J. Andres

Author index