

Co-operative Working using the CIMsteel Integration Standards



Alastair Watson
School of Civil Engineering
University of Leeds

CIMsteel

BASED ON SLIDES FOR "Delivering the Promise": Co-operative Working using the CIS - Slide Number 1

The CIMsteel Project

Computer Integrated Manufacturing for Constructional Steelwork

- **First instigated in 1987 (finished 1998 Q1)**
 - Over 70 Collaborators from 10 European countries
 - » Designers, Steelwork Fabricators, Contractors, Software Houses, Universities and Research Institutes
 - plus links with US, Japan etc.
- **Wide ranging work programmes**
 - enhanced design procedures
 - rationalisation of materials & processes
 - flexible welding cell and MIS
 - world class applications software
 - **CIMsteel Integration Standards (CIS)**



CIMsteel

BASED ON SLIDES FOR "Delivering the Promise": Co-operative Working using the CIS - Slide Number 2

CIMsteel Objectives

- To enhance the competitiveness of the European Constructional Steelwork Industry
 - *through the application of CIM techniques*
- To integrate the activities throughout the life cycle of a steel structure
- To accelerate the development and implementation of European engineering standards and methods

BASED ON SLIDES FOR "Delivering the Promise": *Co-operative Working using the CIS* - Slide Number 3

CIMsteel

CIMsteel Vision

- Faster design, manufacturing and construction
- Improved, cheaper steelwork structures
- Growth potential of constructional steelwork realised
- The construction industry regarded as a world-class manufacturing industry



BASED ON SLIDES FOR "Delivering the Promise": *Co-operative Working using the CIS* - Slide Number 4

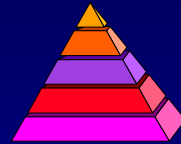
CIMsteel

Requirements for CW

- Required information provided
- Information correct and on-time
- Information in most suitable form
 - digital data
- Support for Concurrent Working
- Goal is Optimal Total Solution
 - contractual drivers
 - shared risk/profit
 - partnering etc.

CIS

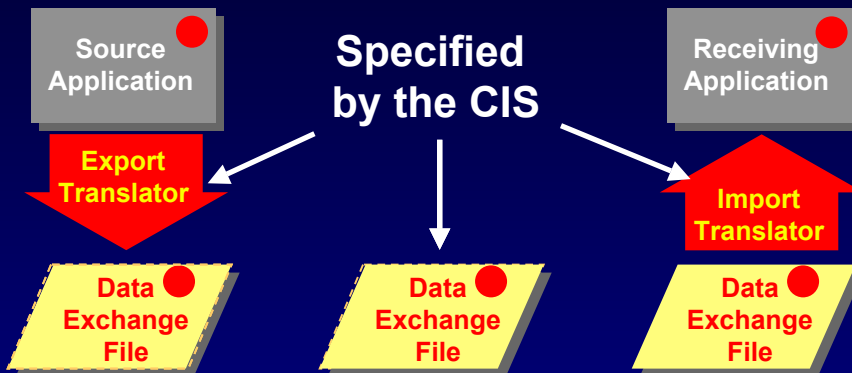
*within and
between
companies*



CIMsteel

BASED ON SLIDES FOR "Delivering the Promise": Co-operative Working using the CIS - Slide Number 5

Data Exchange Specifications



CIMsteel

BASED ON SLIDES FOR "Delivering the Promise": Co-operative Working using the CIS - Slide Number 6

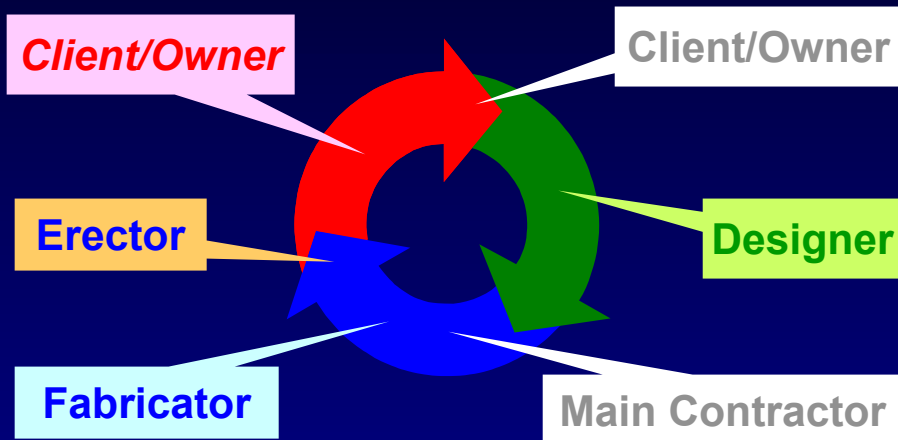
Industrial Objectives

- To integrate the activities involved - *and the computer applications used* - throughout the life cycle of a steel structure
- To achieve industrial deployment within the lifetime of the CIMsteel project

CIMsteel

BASED ON SLIDES FOR "Delivering the Promise": *Co-operative Working using the CIS* - Slide Number 7

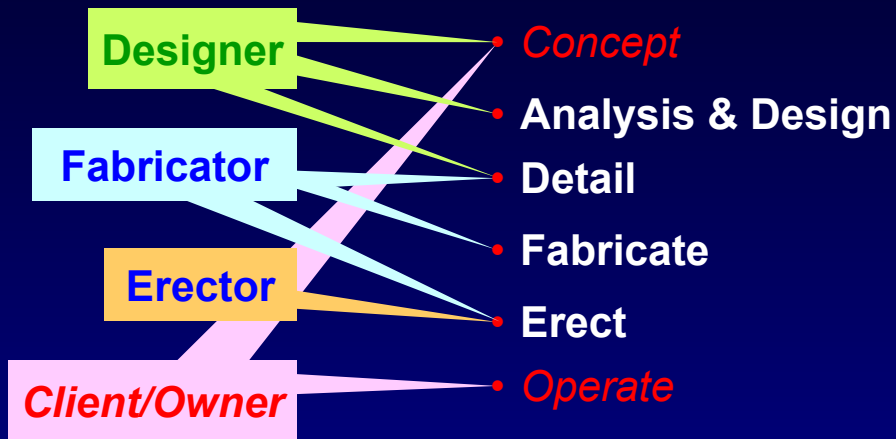
Project Cycle



CIMsteel

BASED ON SLIDES FOR "Delivering the Promise": *Co-operative Working using the CIS* - Slide Number 8

Engineering Activities

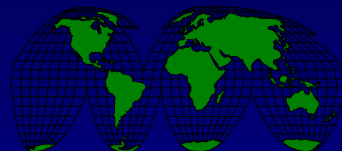


BASED ON SLIDES FOR "Delivering the Promise": *Co-operative Working using the CIS* - Slide Number 9

CIMsteel

The CIS Specifications

- **Suitable for Global deployment (EU + Japan + US)**
- **Building type steel frames**
- **Innovative "product model" technology**
- **Support engineering & construction activities**
 - engineering data throughout frame life-cycle
- **Data exchange (CIS/1)**
- **Data management and data sharing (CIS/2)**



BASED ON SLIDES FOR "Delivering the Promise": *Co-operative Working using the CIS* - Slide Number 10

CIMsteel

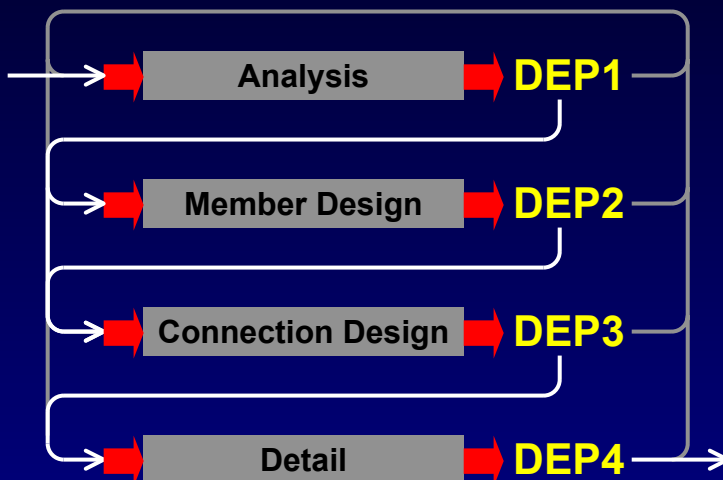
CIS/1: Scope

- **Building-type steel frames**
 - low, medium and high rise
 - domestic, commercial and industrial
- **Aligned with ISO 10303 (STEP)**
- **Four Data Exchange Protocols (DEPs)**
 - defined against common product model

CIMsteel

BASED ON SLIDES FOR "Delivering the Promise": *Co-operative Working using the CIS* - Slide Number 11

CIS/1: Data Exchange Protocols



CIMsteel

BASED ON SLIDES FOR "Delivering the Promise": *Co-operative Working using the CIS* - Slide Number 12

DEP1 Analysis
DEP2 Member Design
DEP3 Connect. Design
DEP4 Detailing

CIS/1: Implementations



SSC - MIS
(GoData)

Available

Under Development

STRUCAD
(Aeccad)

Planned

XSTEEL
(Tekla)

Space for Windows / STAAD/Pro
(Research Engineers)

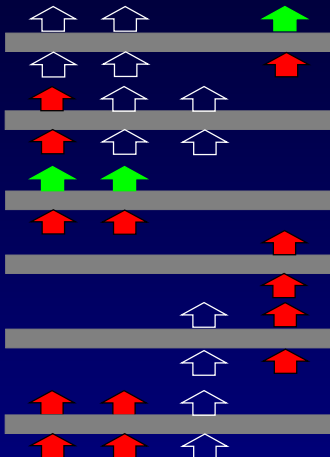
FRAMEWORKS
(Intergraph)

CIMsteel

BASED ON SLIDES FOR "Delivering the Promise": Co-operative Working using the CIS - Slide Number 13

DEP1 Analysis
DEP2 Member Design
DEP3 Connect. Design
DEP4 Detailing

CIS/1: Implementations



FASTRACK Portals for Windows
(CSC)

RM SPACEFRAME
(TDV)

STRAP
(ATIR)

StBrowser
(Finnish Constructional Steelwork Association)

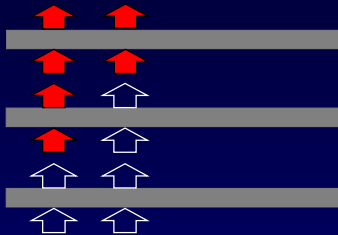
DSCsteel
(DSC)

ROBOT 97
(RoboBAT)

CIMsteel

BASED ON SLIDES FOR "Delivering the Promise": Co-operative Working using the CIS - Slide Number 14

DEP1 DEP2 DEP3 DEP4
Analysis *Member* *Connect.* *Detailing*
Design *Design* *Design*



CIS/1: Implementations

SAP2000, ETABS, FLOOR
(Computers & Structures Inc.)

GSA
(Oasys)

StruCAD*3D
(Zentech Inc)

Recent CIS Registered Developers

- Fluor Daniel Inc (USA)
- Interstate Iron Works Corp (USA)
- BOCAD (Germany)
- Butler Manufacturing Co (USA)

BASED ON SLIDES FOR "Delivering the Promise": *Co-operative Working using the CIS* - Slide Number 15

CIMsteel

CIS/1: Today

- **Conformance Testing**
- **Reference Sites**
- **A first for Construction!**

**The first product model based
standard that addresses the full
engineering process to be deployed
by industry**

BASED ON SLIDES FOR "Delivering the Promise": *Co-operative Working using the CIS* - Slide Number 16

CIMsteel

The CIMsteel Integration Standards

CIS/2: Enhanced Industrial Solution

CIMsteel

BASED ON SLIDES FOR "Delivering the Promise": *Co-operative Working using the CIS* - Slide Number 17

CIS/2: Scope

- **Substantially extended product model**
 - complex members
 - members curved in 3D
 - tolerances etc.
 - any building frame plus process plant etc.
- **More closely aligned with ISO 10303**
 - hybrid ARM/AIM + multiple conformance classes
- **Data exchange + management and sharing**

CIMsteel

BASED ON SLIDES FOR "Delivering the Promise": *Co-operative Working using the CIS* - Slide Number 18

CIS/2: Open Data Management



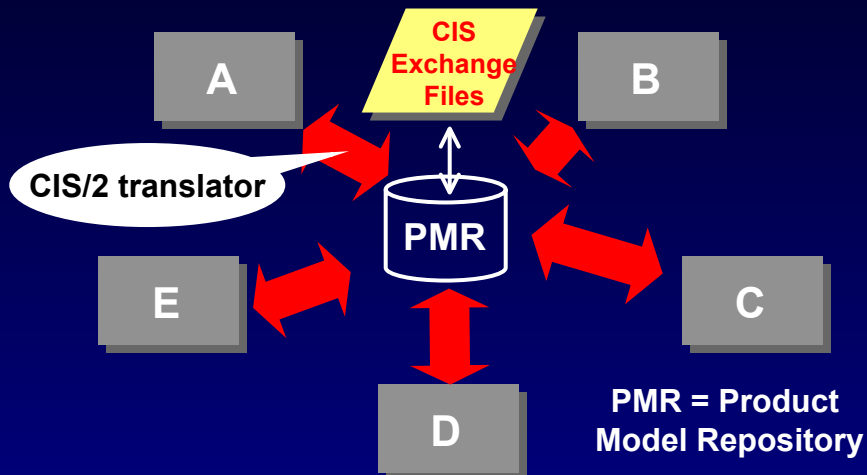
Engineering revisions!

- “Data Management Conformant” translators
 - Origin and history of all data tracked
 - Incremental import translators possible

CIMsteel

BASED ON SLIDES FOR "Delivering the Promise": Co-operative Working using the CIS - Slide Number 19

CIS/2: Open Data Sharing



CIMsteel

BASED ON SLIDES FOR "Delivering the Promise": Co-operative Working using the CIS - Slide Number 20

CIS/2: Latest News

**CIS/2 Beta Release CD-ROM
issued to software developers
for comment in July 1998**

CIMsteel

BASED ON SLIDES FOR "Delivering the Promise": *Co-operative Working using the CIS* - Slide Number 21

The CIMsteel Integration Standards

***AP230: Future ISO
Standard***

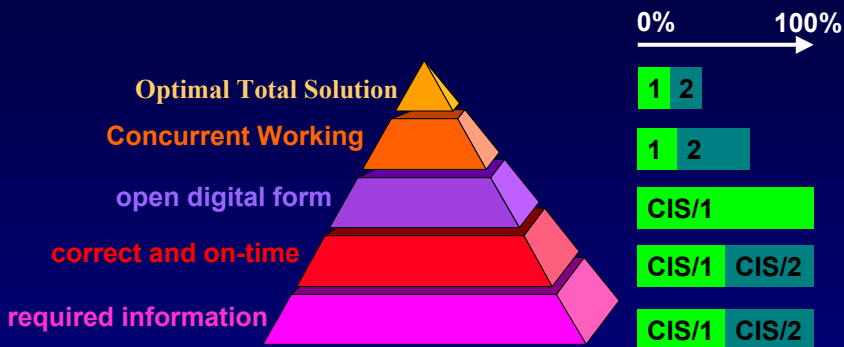
ISO 10303 (STEP) - Part 230

CIMsteel

BASED ON SLIDES FOR "Delivering the Promise": *Co-operative Working using the CIS* - Slide Number 22

Co-operative Working

within and between companies



BASED ON SLIDES FOR "Delivering the Promise": Co-operative Working using the CIS - Slide Number 23

CIMsteel

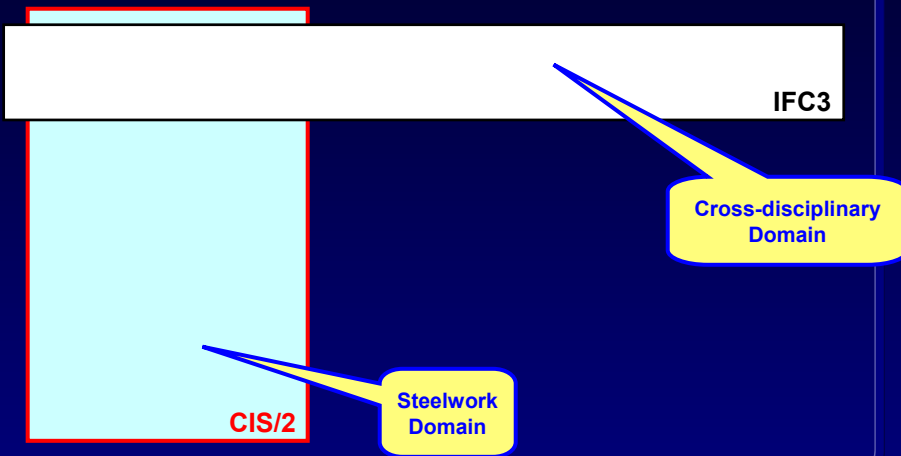
CIS <> IFC

- Working title for UK project proposal to establish two-way information mappings between:
 - CIS Steelwork Domain
 - IFC Cross-discipline Domain
- Two stage:
 - CIS/2 <> IFC3 : Shape Representation
 - CIS/2 <> IFC4 : Technical Information
- Collaborations:
 - SteelBase + IAI ST-1
 - Esprite ProCure

BASED ON SLIDES FOR "Delivering the Promise": Co-operative Working using the CIS - Slide Number 24

CIMsteel

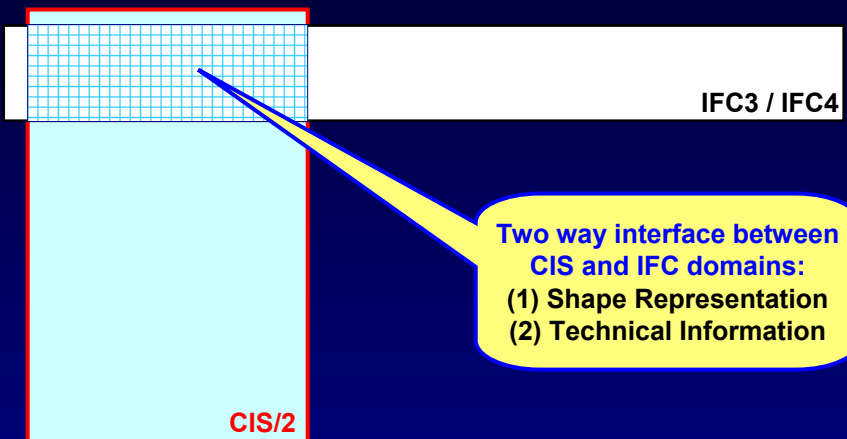
CIS <> IFC



CIMsteel

BASED ON SLIDES FOR "Delivering the Promise": *Co-operative Working using the CIS* - Slide Number 25

CIS <> IFC



CIMsteel

BASED ON SLIDES FOR "Delivering the Promise": *Co-operative Working using the CIS* - Slide Number 26

The CIS

- **Driven by Industrial Objectives**
- **Innovative Technology**
- **“Open” Standards**
- **Pragmatic and Incremental**



CIMsteel