

ARCONA Neutral Intelligent Cad-Communication (NICC)Väino Tarandi, M.Sc.Civ.Eng
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the seminar of CIB W78 + W74 about COMPUTER INTEGRATED CONSTRUCTION in
Tokyo, Japan 17-19 September 1990**Abstract**

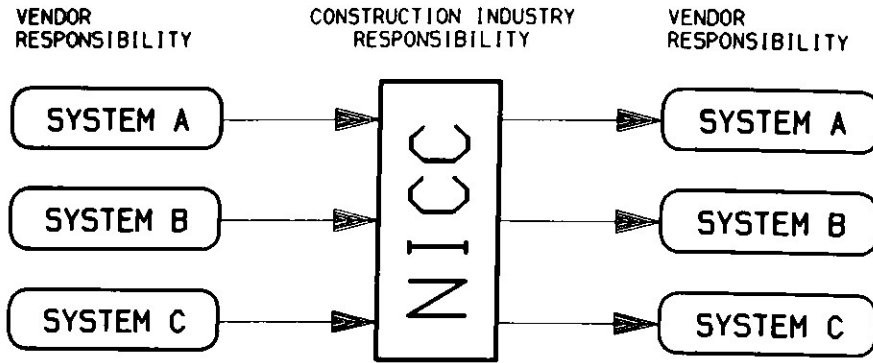
Intelligent CAD-drawings with building parts connected to alpha-numerical data, classified after the swedish "BSAB" system, need a more intelligent communication format than today available. A wall in system A must be possible to send with its information to system B, where it can be stored in the format of that system.

The idea is to use one format, NICC, which all applications has to write and read. A group of 10 companies was formed, representing a broad competens in the CAD and design area. They cover MEDUSA, AUTOCAD, INTERGRAPH and GDS applications, which are the most frequent in swedish building industry today!

NICC will be used for archival purposes and communication of graphics and intelligent information in both drawing and model oriented CAD-systems. The format is "readable" in ASCII format and is planned to take use of the EDIFACT syntax. The project started in april 1989 and will continue until june 1990. It will result in a theoretical format that describes how data shall be structured, and in seven prototypes that can be used for demos.

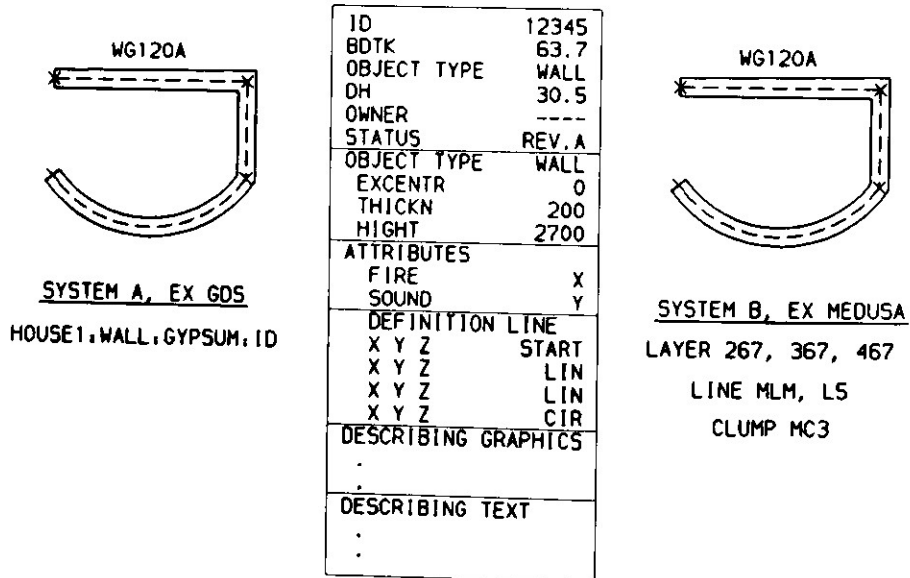
THE IDEA

NEUTRAL INTELLIGENT CAD-COMMUNICATION

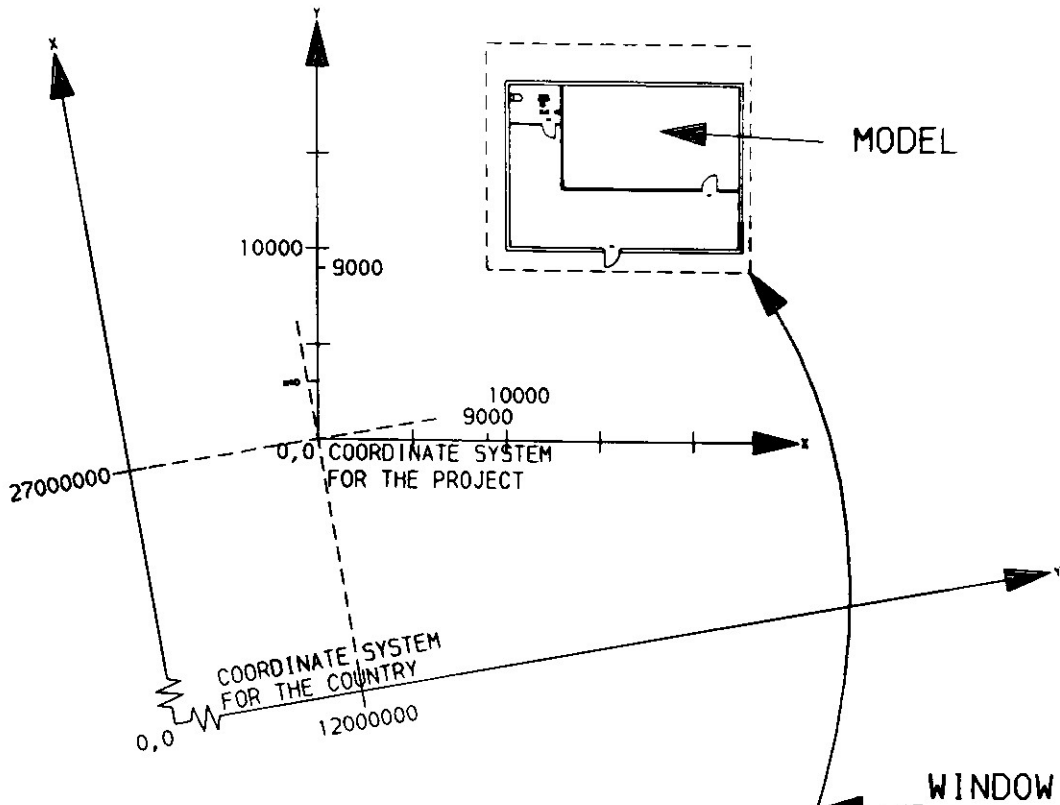


INTELLIGENT LEVEL

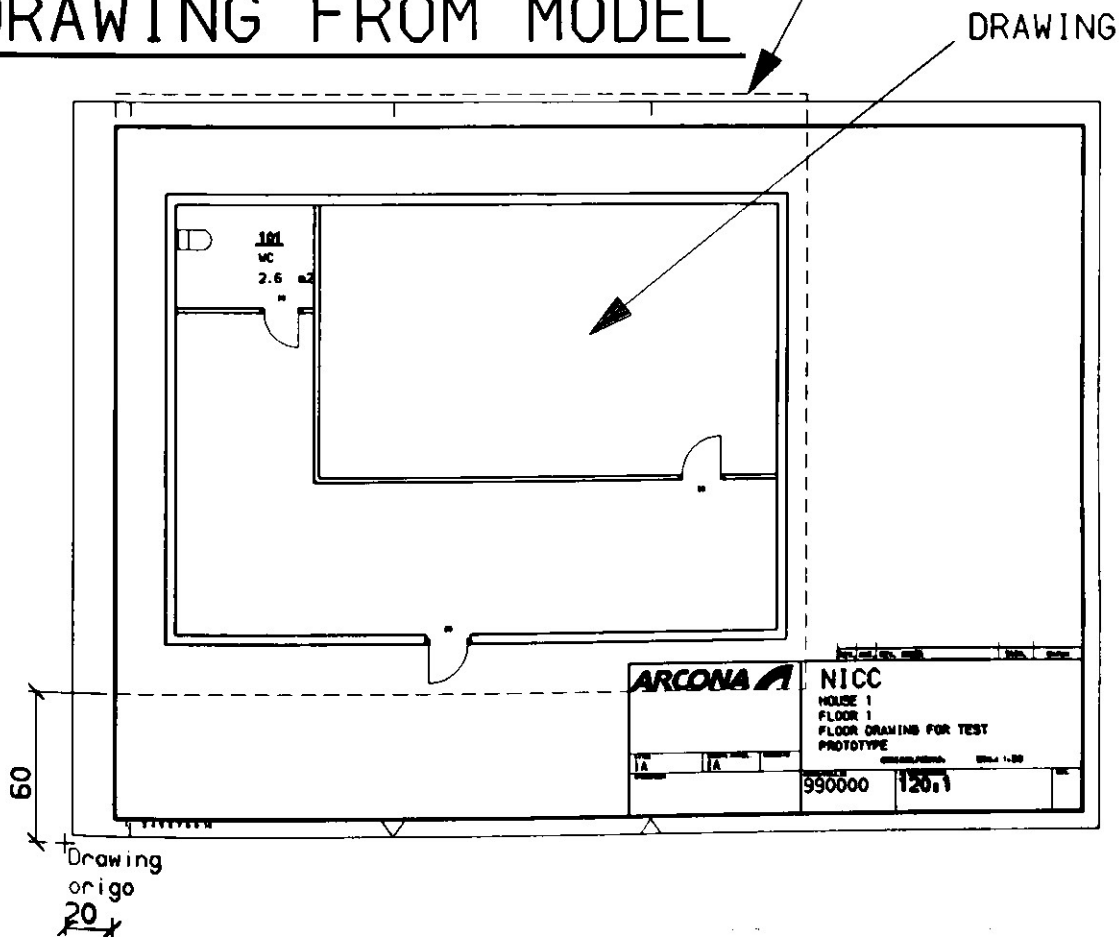
NEUTRAL INTELLIGENT CAD-COMMUNICATION



COORDINATE SYSTEMS



DRAWING FROM MODEL



FILE FORMAT
NICC-STRUCTURES

Status: 1990-06-25 V8ino Tarandi

DECLARATIONFILE

HF	-----	Mand.
HP	-----	Mand.
Code definitions		
HC	-----	Mand.
Line types		
CL	-----	Cond.
Point functions		
CP	-----	Cond.
Font types		
CP	-----	Cond.
BDTK (Building Part Type Code)		
CB	-----	Cond.
GGTK (Graphical Group Type Code)		
CG	-----	Cond.
Attribute definitions		
CA	-----	Cond.
Wall types		
CW	-----	Cond.
Material		
CM	-----	Cond.
Symbols		
HS	-----	Mand.
Attribute list for type dependent data		
AT	-----	Cond.
VA	-----	Mand.
Lines in "Describing graphics"		
LI	-----	Cond.
LC	-----	Mand.
Text in "Describing text"		
TX	-----	Cond.
VA	-----	Mand.
DP	-----	Mand.
RM	-----	Only

DRAWING FILE

HF	-----	Mand
HP	-----	Mand
HD	-----	Mand
Drawing Window (Is defined in model coordinates)		
DW	-----	Cond
LC	-----	Mand
DP	-----	Mand
"Window Content" from the model. BDTK, GGTK		
WC	-----	Cond
Details (Graphical groupings without model relations)		
DE	-----	Cond
Attribute list		
AT	-----	Cond
VA	-----	Mand
Lines in "Describing graphics"		
LI	-----	Cond
LC	-----	Mand
Text in "Describing text"		
TX	-----	Cond
VA	-----	Mand
DP	-----	Mand
Symbol in the graphical grouping		
SY	-----	Cond
DP	-----	Mand

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NICC-FILE (Transmission of building parts)

RF	-----	Mand
HP	-----	Mand
HV	-----	Mand
DP	-----	Mand
Building part with or without symbol		
BP	-----	Mand
Relation		
RE	-----	Repe
AT	-----	Cond
VA	-----	Cond
Attribute list		
AT	-----	Cond
VA	-----	Mand
Datum point for symbol		
DP	-----	Mand
RM	-----	3D
Definition line, Mand for grtype 10,20,70		
LD	-----	Mand
LC	-----	Mand
Lines in "Describing graphics"		
LI	-----	Cond
LC	-----	Mand
Text in "Describing text"		
TX	-----	Cond
VA	-----	Mand
DP	-----	Mand
RM	-----	3D
Graphical grouping in the model (System lines etc)		
GG	-----	Cond
Attribute list		
AT	-----	Cond
VA	-----	Mand
Lines in "Describing graphics"		
LI	-----	Cond
LC	-----	Mand
Text in "Describing text"		
TX	-----	Cond
VA	-----	Mand
DP	-----	Mand
RM	-----	3D
Symbol in graphical groupings		
SY	-----	Cond
DP	-----	Mand
RM	-----	3D

RECORDS IN THE "NICC-FILE"

(Building parts and graphical groupings)



ADMINISTRATIVE DEFINITIONS

DATUM-POINT

DP	Seqnr	Rectype	X	Y	Z	Rot
00022	DP	123	123	123	123	90

ATTRIBUTE

AT	Seqnr	Rectype	Graphinteract	Explanation
00022	AT	1	4	I \$THIC Thickness

The number of lines defines how many VA-records that follow this record
Only one value per VA-record with the defined format.

VALUE

VA	Seqnr	Rectype	Value
00022	VA	Value_of_the_record	60

ROTATION MATRIX

RM	Seqnr	Rectype	X-rot	Y-rot	Z-rot
00022	RM	45	45	45	

VOLUMES

HEADER VOLUME

HV	Seqnr	Rectype	House	Floor	dX	dY	dZ
00022	HV	House1	Floor1	123	123	123	

Is always followed by a DP-record

BUILDING PART

BUILDING PART DEFINITION

BP	Seqnr	Rectype	BDTK	Extend.BDTK	Changes	Datum	Code
00022	BP	00006	31	12	10	Parta M	Reva

RELATIONS

RE	Seqnr	Rectype	Connect_ID	Connect_type
00022	RE	ID123		D

DEFINITION LINES

LD	Seqnr	Rectype	Start*	End*	Exc
00022	LD	O C	-100		

* START / END

CONNECTION TYPE

GRAPHICAL LINES

LI	Seqnr	Rectype	Color
00022	LI	1	0.5 202020

*1 Type
*2 LT

LINE TYPE
(DIN - STANDARD), LINE TH

LINE COORDINATES

LC	Seqnr	Post	X	Y	Z	Segment	Vis	PF
00022	LC	123	123	123	123	L V 0		
00023	LC	x	y	z		C V 0		
00024	LC	x	y	z		+ I 0		
00025	LC	x	y	z		E I 0		

*1 LINE SEGMENT
Type of segment to the next coordinate
*2 VISIBILITY
Visible, invisible
*3 POINT FUNCTIONS

TEXT DEFINITION

TX	Seqnr	Rectype	Scale	Just	Font_type	LT	Color
00022	TX	300	3.5	50	0000	NORM	0.5 202020

ADMINISTRATIVE RECORDS

(In the beginning of a file or a group of records)

HEADER FILE

HF	Seqnr	Rectype	Datum	Filename	Company	Sign	Status
00022	HF	00.1	891217	NICC-TEST	ARCONA	VTI	New_file

HEADER PROJECT

HP	Seqnr	Rectype	Project-ID	Length unit	Angle unit	Angle
00022	HP	PROTOTYPE	MM	DEG	27000000	0

*1 In the coordinate system of the country

HEADER CODES

HC	Seqnr	Rectype
00022	HC	

DRAWING RECORDS

HEADER DRAWING

HD	Seqnr	Rectype	Drawing_number/name	Drawing_length	Drawingheight
00022	HD	120:1		9	

DRAWING WINDOW

DW	Seqnr	Rectype	House	Floor	Scale
00022	DW	HOUSE1	FLOOR1		50

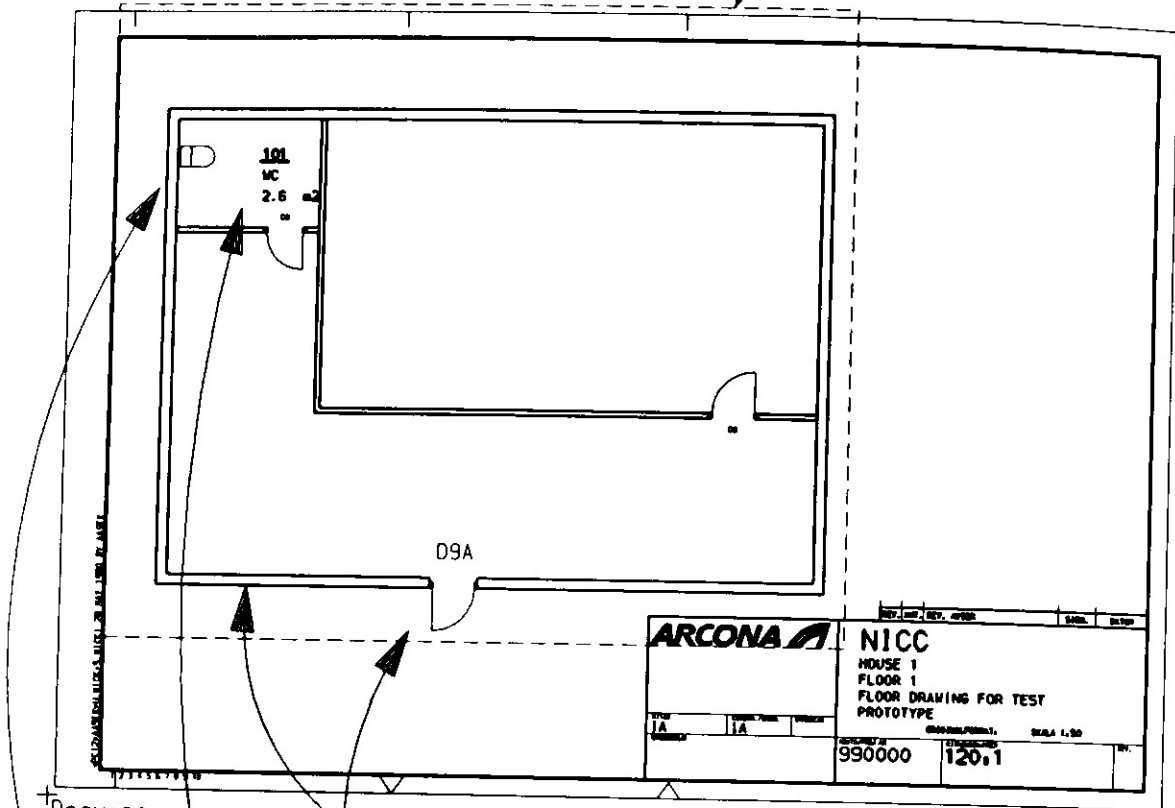
Always followed by DP-record!

WINDOW CONTENT

WC	Seqnr	Rectype	BDTK	Ext.
00022	WC			

THE EXAMPLE

WINDOW



WALL

00007 BP 00000 31 10 A N New_file 900209 I W1
00008 AT 1 1 F \$THIC Thickness
00009 VA 200.
00010 AT 2 1 F \$HIGHT Hight
00011 VA 2800.
00012 LD 4 0.35 0 0 +0 000000
00013 LC 10100.00 10100.00 0.00 L V 0
00014 LC 10100.00 18900.00 0.00 L V 0
00015 LC 22500.00 18900.00 0.00 L V 0
00016 LC 22500.00 10100.00 0.00 L V 0
00017 LC 10100.00 10100.00 0.00 E V 0

DOOR

00018 BP 00007 55 40 A N New_file 900209 I D9A
00019 AT 1 1 F \$WIDTH Width
00020 VA 910.
00021 AT 2 1 F \$HIGHT Hight
00022 VA 2100.
00023 AT 1 1 F \$DEPTH Distance_to_door
00024 VA 115.
00025 DP 15200.00 10000.00 0.00 0.0

TOILET

00059 BP 00000 75 30 A N New_file 900209 I TOIL1
00060 AT 2 1 C \$MAN Manufacturer
00061 VA Gustavsberg
00062 AT 2 1 C \$COLOR Color
00063 VA White
00064 DP 10200.00 18100.00 0.00 90.0

ROOM

00065 GG 900 A N 900209
00066 TX 9. 3.5 50. 0000 NORM2 0.35 000000
00067 VA 101
00068 DP 11800.00 18000.00 0.00 0.0
00069 TX 6. 3.5 50. 0000 NORM2 0.35 000000
00070 VA WC
00071 DP 11800.00 17600.00 0.00 0.0
00072 TX 22. 3.5 50. 0000 NORM2 0.35 000000
00073 VA 2.6 m²
00074 DP 11800.00 17200.00 0.00 0.0