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Paper No. 10: Steerbear 3 with Interactive Graphics

U.S. DEPARTMENT OF THE NAVY
CARDEROCK DIVISION,
NAVAL SURFACE WARFARE CENTER

Report Documentation Page

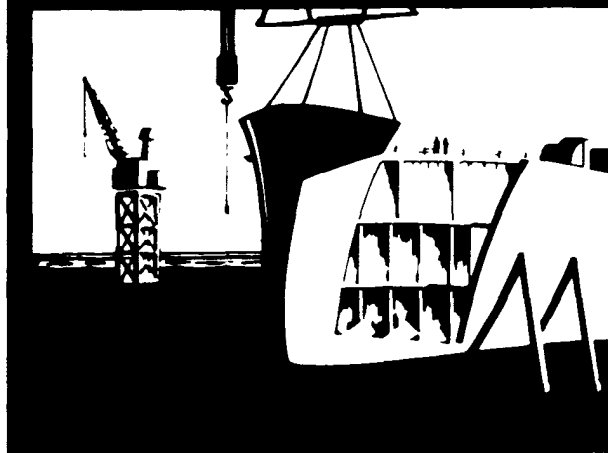
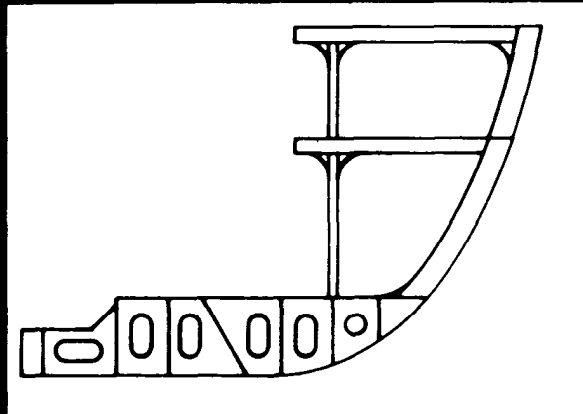
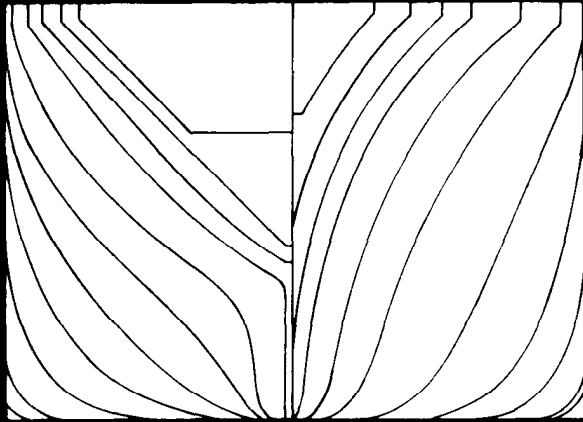
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FOR
AUTOMATION
AND
PRODUCTIVITY
IN
SHIPBUILDING

**Proceedings of the
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October 14-16, 1980
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STEERBEAR 3 WITH INTERACTIVE GRAPHICS

Kai Holmgren
Managing Director
Kokums Computer Systems AB

Mr. Holmgren's main task is supervision of the integrated computer-based systems STEERBEAR and SYSTEM Q, which are used at Kokums and at a number of other yards throughout the world. He holds a degree in Economics. Past experience includes the position of system analyst at the Swedish Aircraft Company, and head of engineering computer applications at the Swedish Aero-engine company.

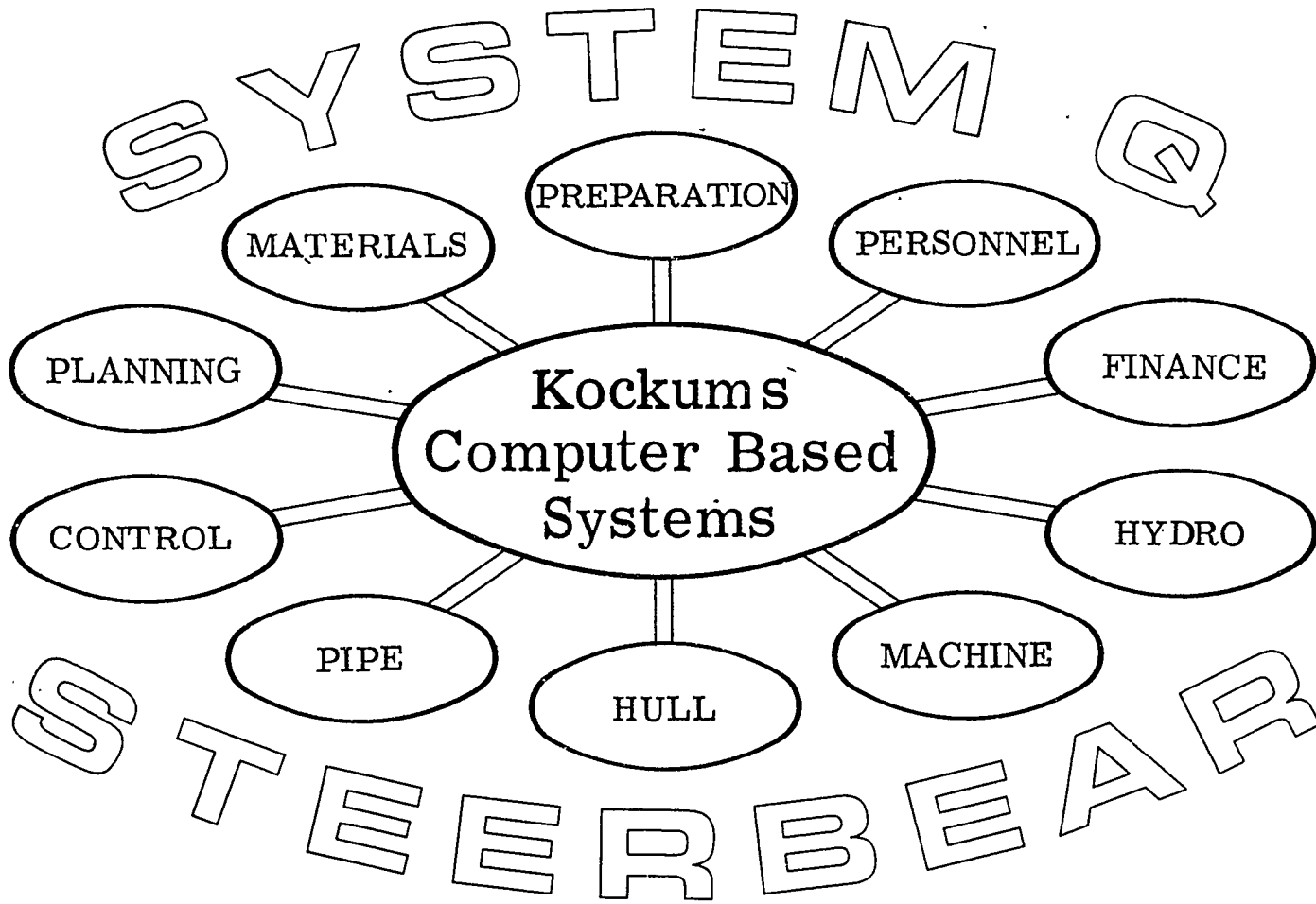
ABSTRACT

The development of the next generation of STEERBEAR (SB 3) is underway. The efforts are concentrated on general basic software adapted to interactive graphics and suited to a variety of applications and in particular to a new STEERBEAR HULL system (SBH 3). The main new features of SBH 3 will be:

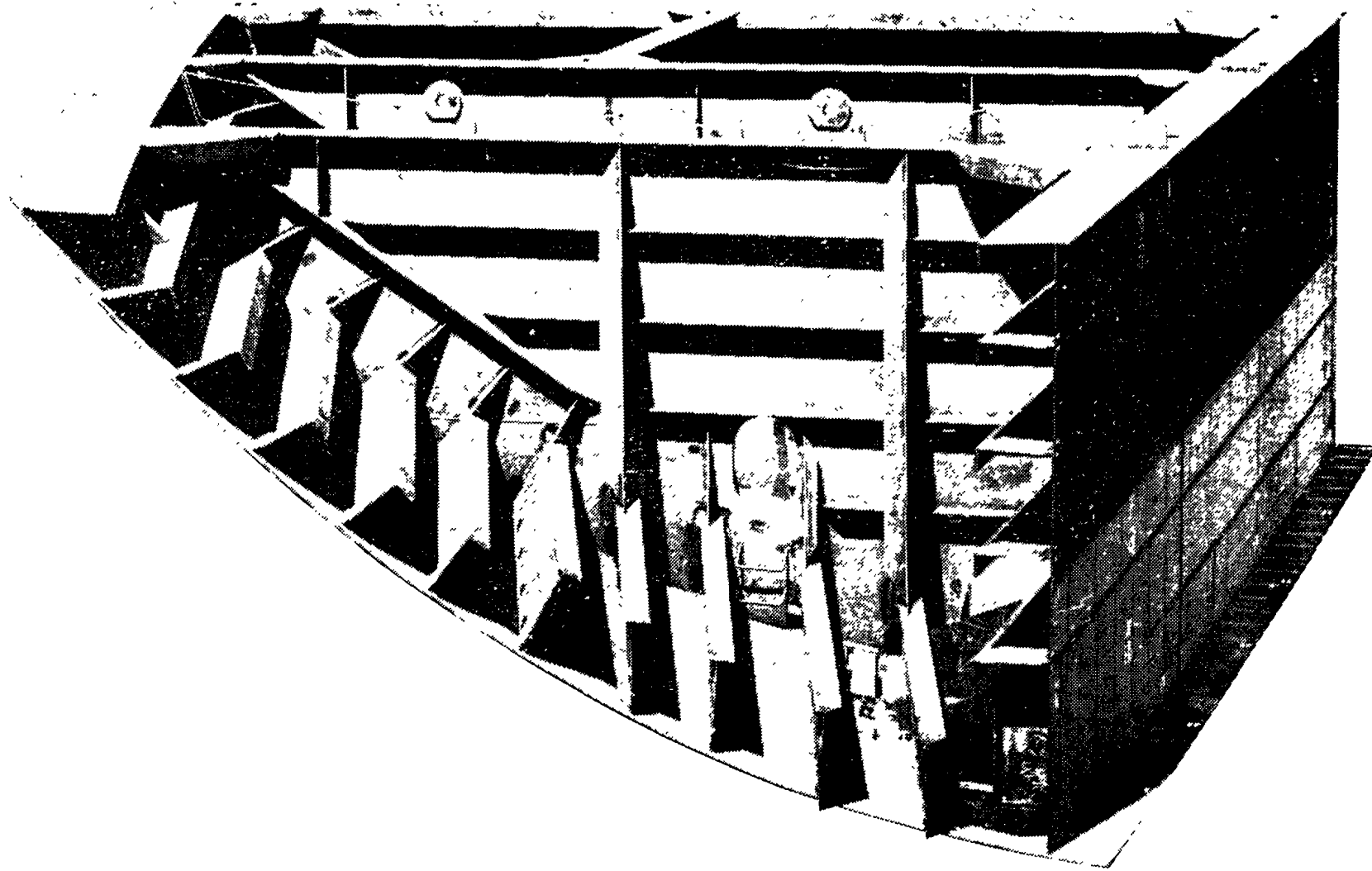
- Interactive graphics available where feasible.
- Improved facilities for generation and handling of three-dimensional curves and surfaces.
- Parametric design modules covering more complex elements than in SBH 2.
- Improved facilities to create and use a 'product description'.
- Distribution of the computer work between main frames, mini- and microcomputers.

A system work station is composed of a Digital Equipment microcomputer, a Tekronix storage tube with refresh capability, an alphanumeric screen and a graphic tablet. Basic graphic software has been developed and is operational on the work station. Within a few months the system work station will be used to present graphic output from SBH 2. The computers used are a PDP 11/34 and an IBM main frame.

During the first quarter of 1981 a system for interactive working drawing composition will be in operation connected to SBH 2. Text and drawings generated by the current structure generation system can be combined and supplemented at the work station and then be returned to the main frame for further processing. The total development program of SBH 3 including basis interactive fairing and interactive nesting will be finished before the end of 1982.



The panel concept



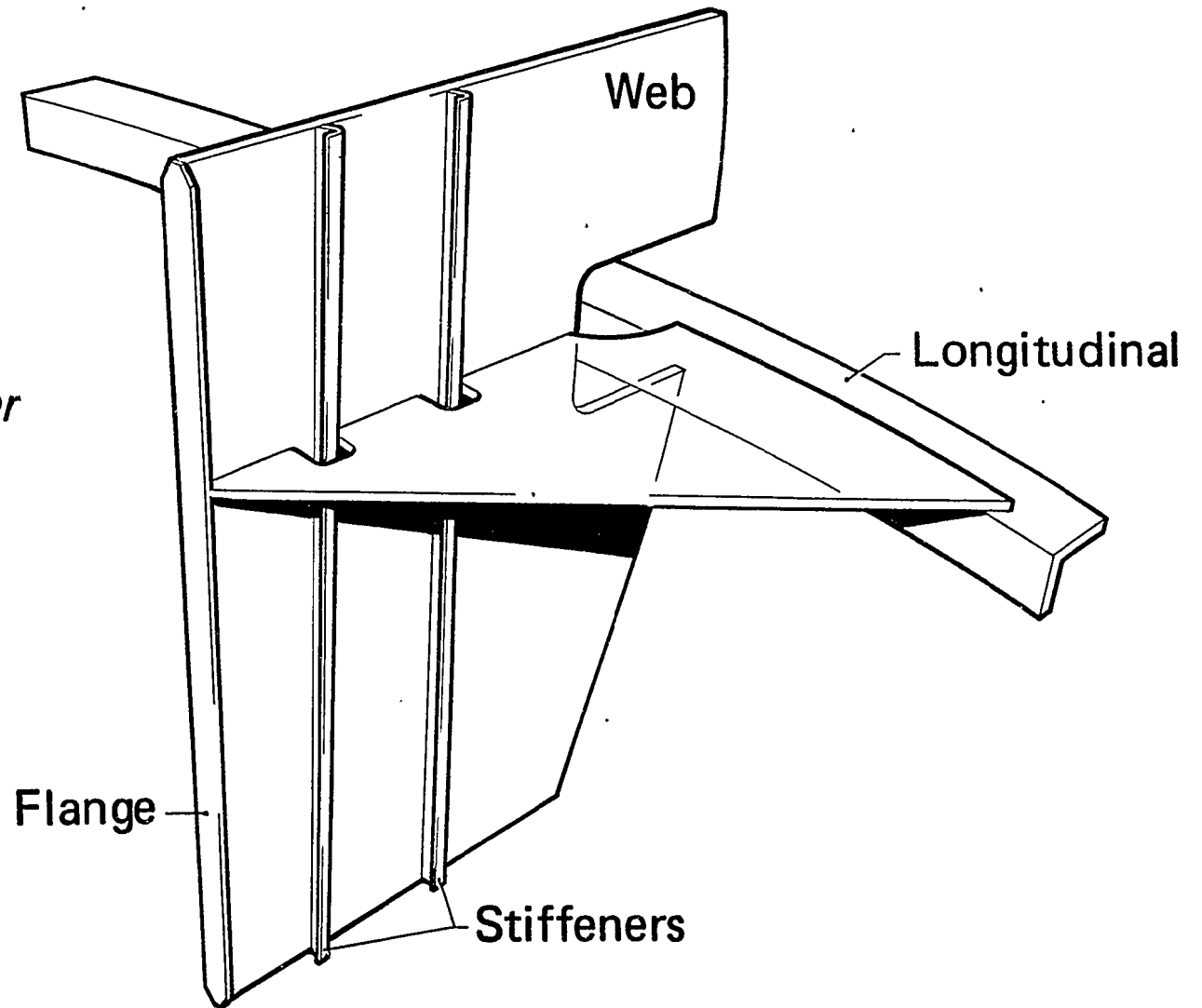
Tripping bracket

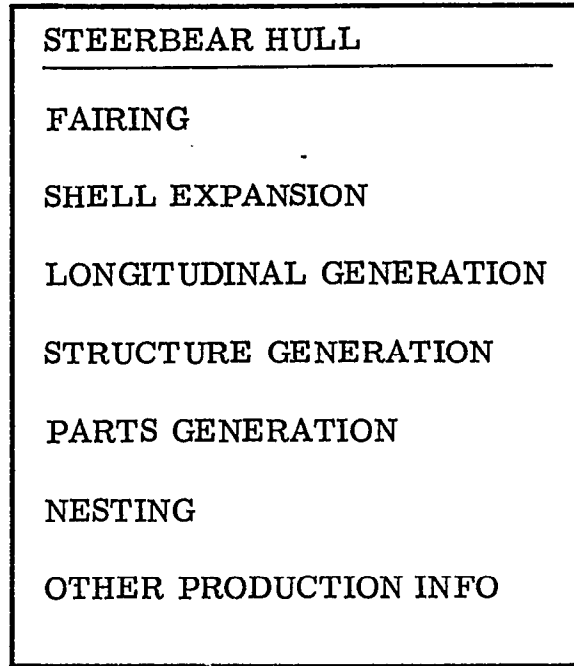
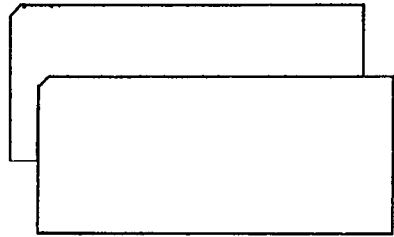
Input:

- *Connection code*
- *Longitudinal number*
- *Thickness*
- *Side*
- *Quality*

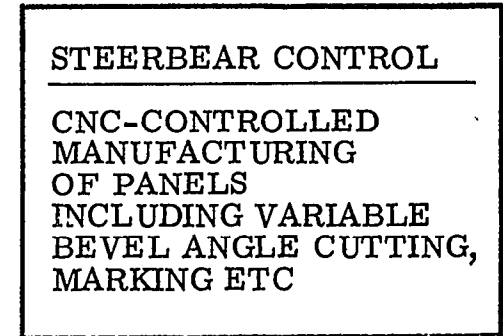
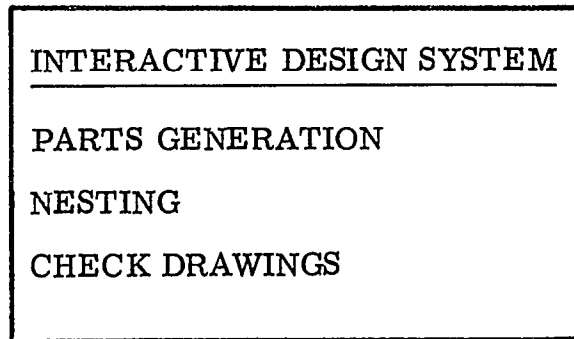
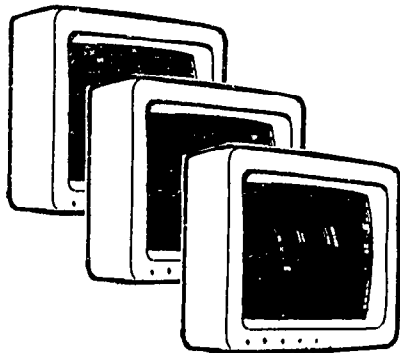
Result:

*The bracket
generated and stored*





- Body plan
- ⇒ - Material specifications
- Bending templates
- ⇒ - Jigs
- Working drawings
- ⇒ - Manufacturing lists for profiles
- ⇒ - Weight and centre of gravity
- 2- and 3-axis NC-flame-cutter tapes
- etc

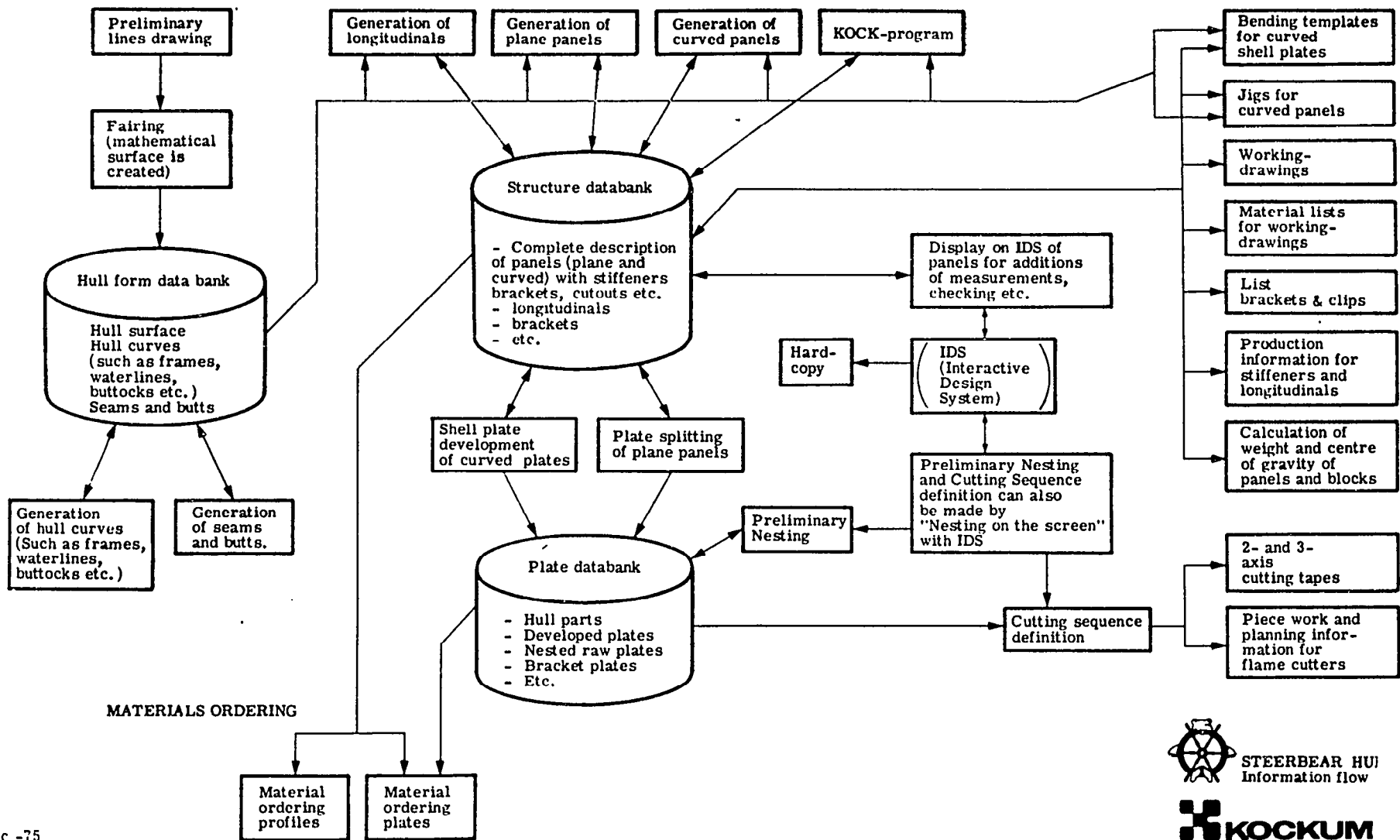


FARING ETC.

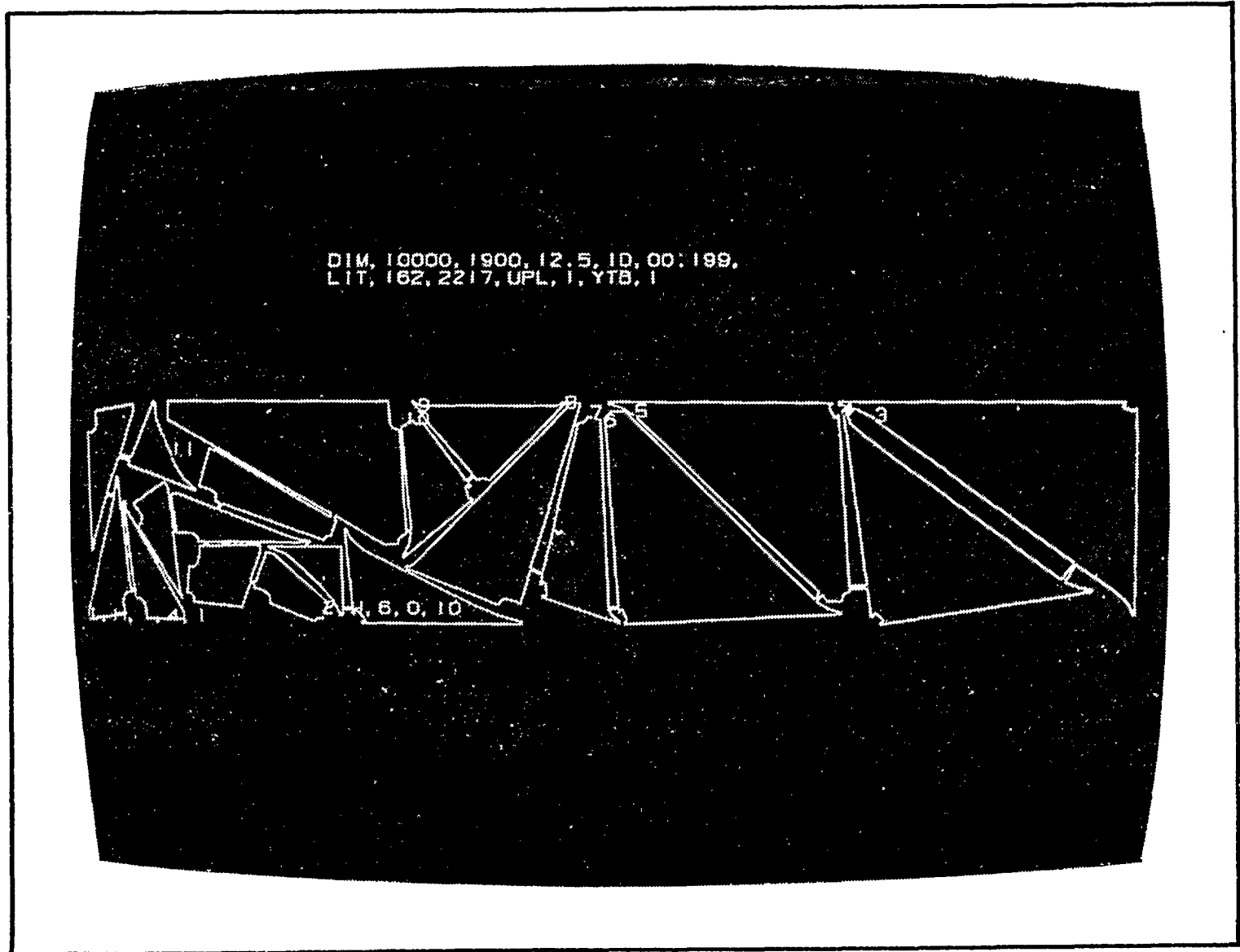
HULL STRUCTURE GENERATION ETC.

PRODUCTION INFORMATION

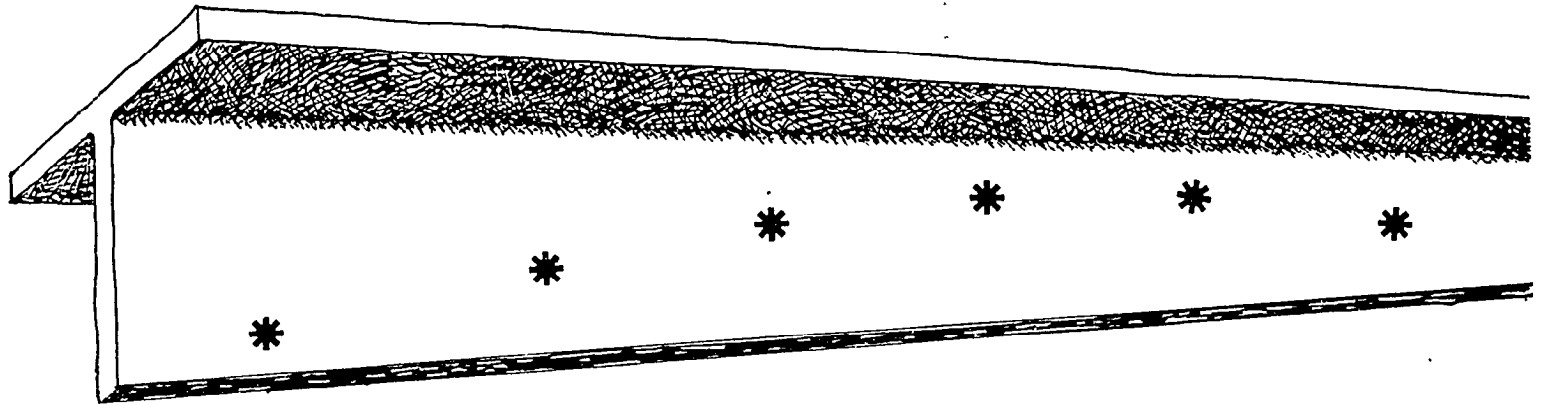
226



Complete nesting



Longitudinal bending table

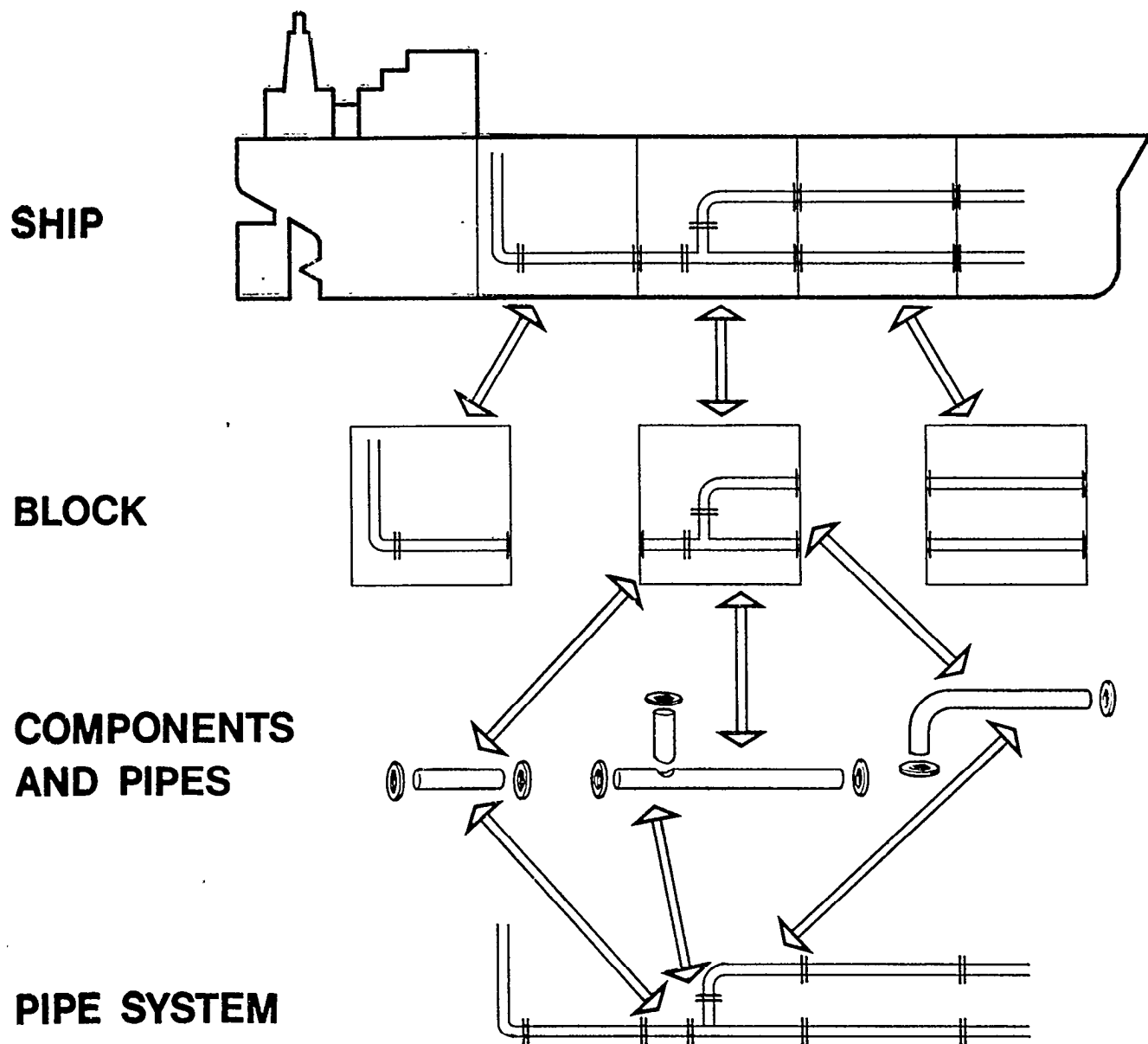


228

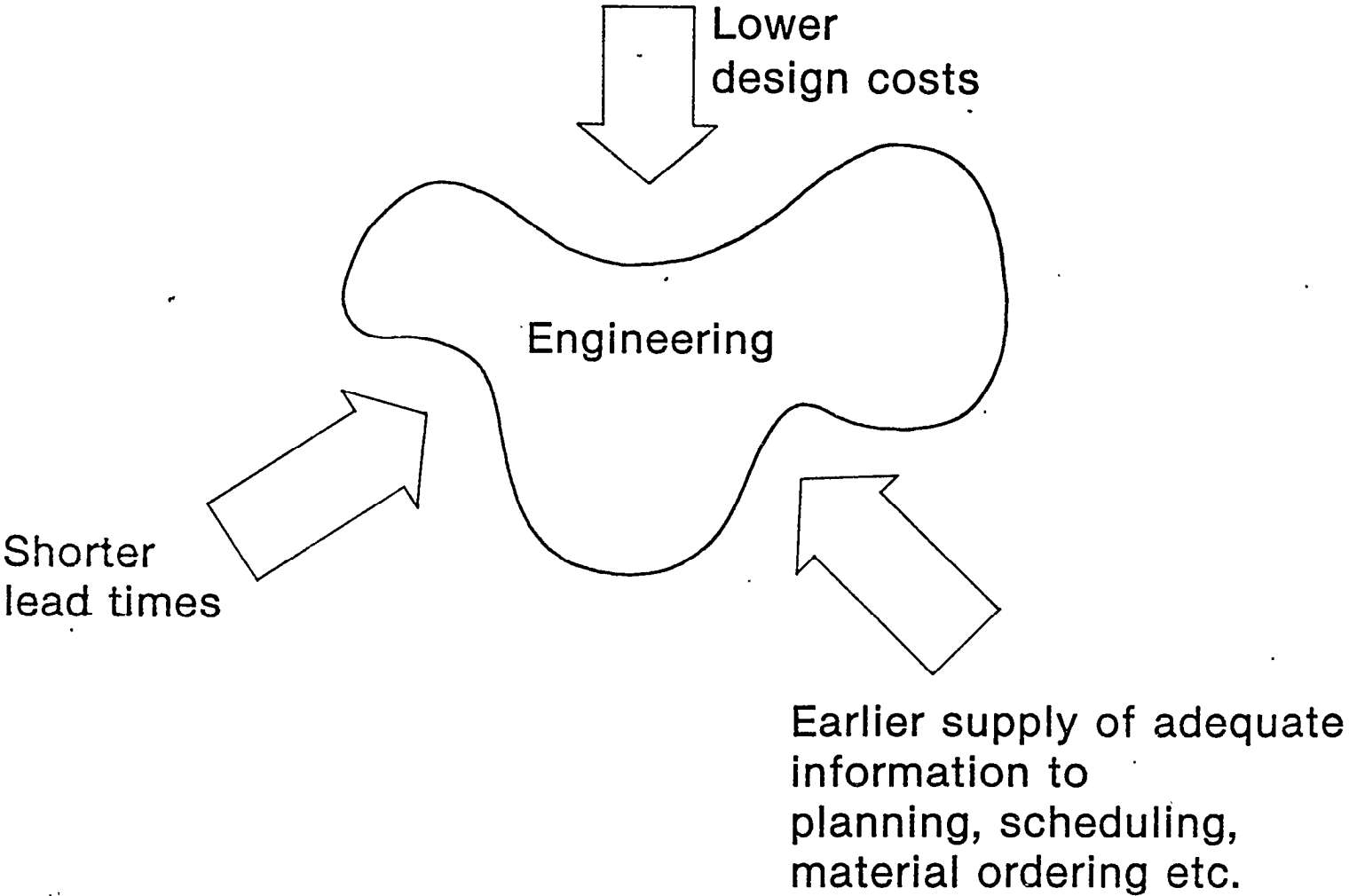
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TS109A * STEERBFAR 2 BY KMV *		750507				122/30252/-	510552	122	2331	23371	1				
RNR-GNR-PNR	LENGTH	/ S S / DS AS / DS AS /	PS /	WEIGHT /	TYPE	MARK	E N D C U T C O D E				BEVL	BEVF			
							A	B	C	R1	R2	V1	V2	V3	V4
222-3-3	14731	/-- -- /	1 --/	1223 /	*1*	21	AFT					90.0	90		
					2	21						90.0	30		
TYPE/DIM:31/500*120*13,5*35.0															
BYINGMARK :451215															
HE150*75		+++++ H O L E +++++													
		v=53 U=3108,10394,13392													
B E N D I N G T A B L E															
=====															
/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
/DIST	HEIGHT	/DIST	HEIGHT	/DIST	HEIGHT	/DIST	HEIGHT	/DIST	HEIGHT	/DIST	HEIGHT	/DIST	HEIGHT	/DIST	HEIGHT
=====															
/		331	/	4000	335	/	8000	338	/	12000	337	/			
/	500	332	/	4500	335	/	8500	338	/	12500	336	/			
/	1000	332	/	5000	336	/	9000	338	/	13000	335	/			
/	1500	333	/	5500	336	/	9500	338	/	13500	334	/			
=====															

STEERBEAR PIPE

- Data Bank Structure

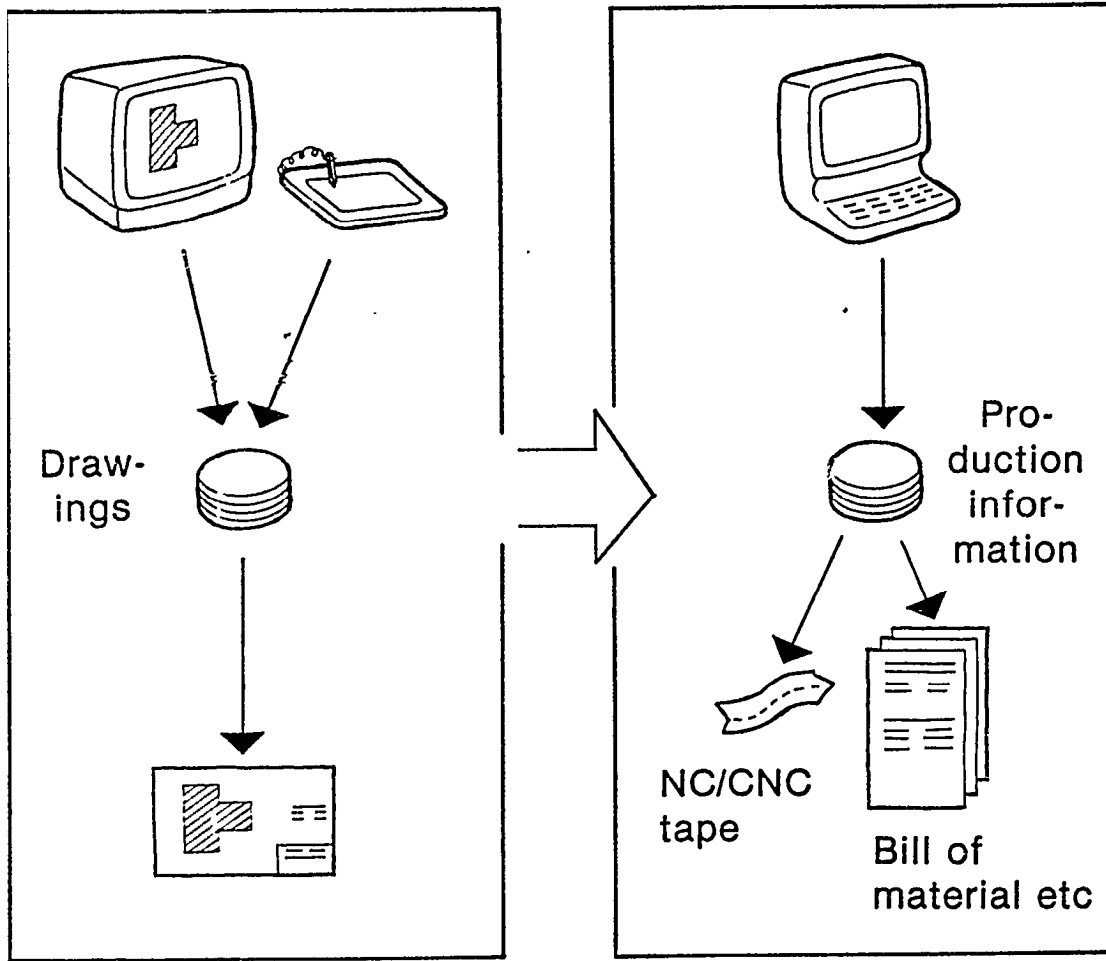


Requirements on Engineering



Computerized Drawing Oriented System

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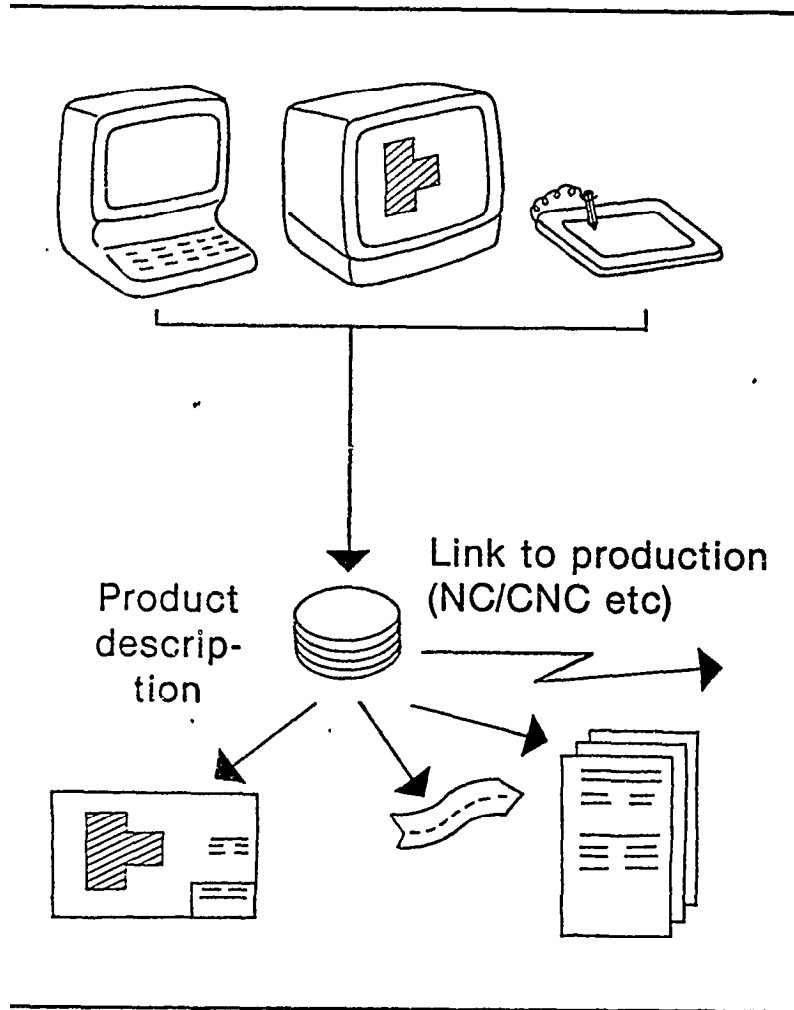


Two different systems
or two isolated functions
of one system

The product is represented in the system as drawings.

Great efforts required to create production information.

Computerized Product Oriented System



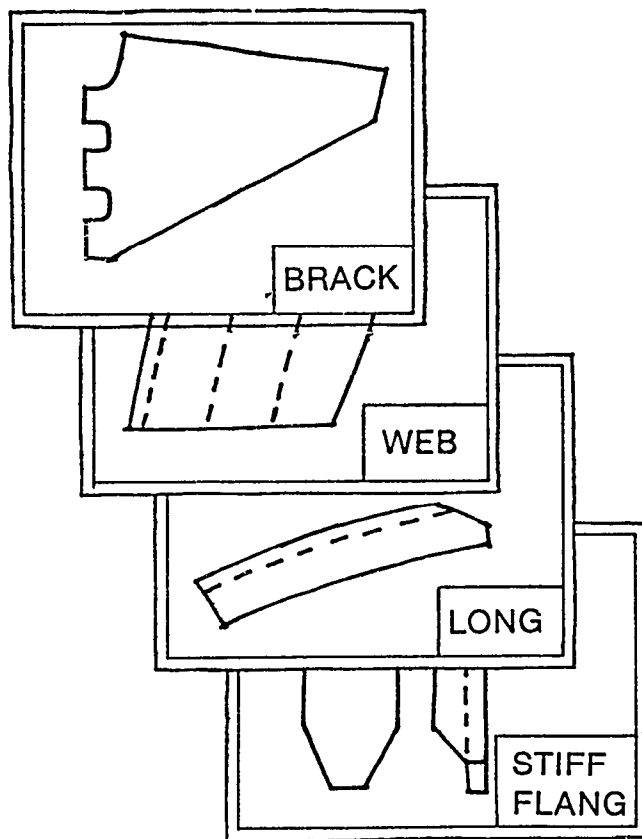
One integrated system with a common data base for all functions.

The product is represented in the system as a product description, ie a physical (in 3D) and functional description with connected administrative data.

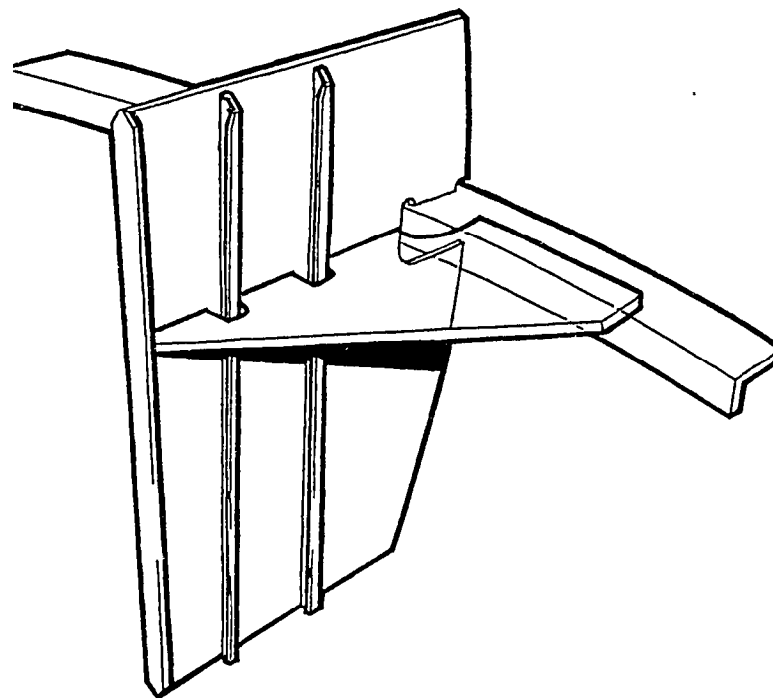
Drawings and other production information are derived from the product description.

C o m p a r i s o n

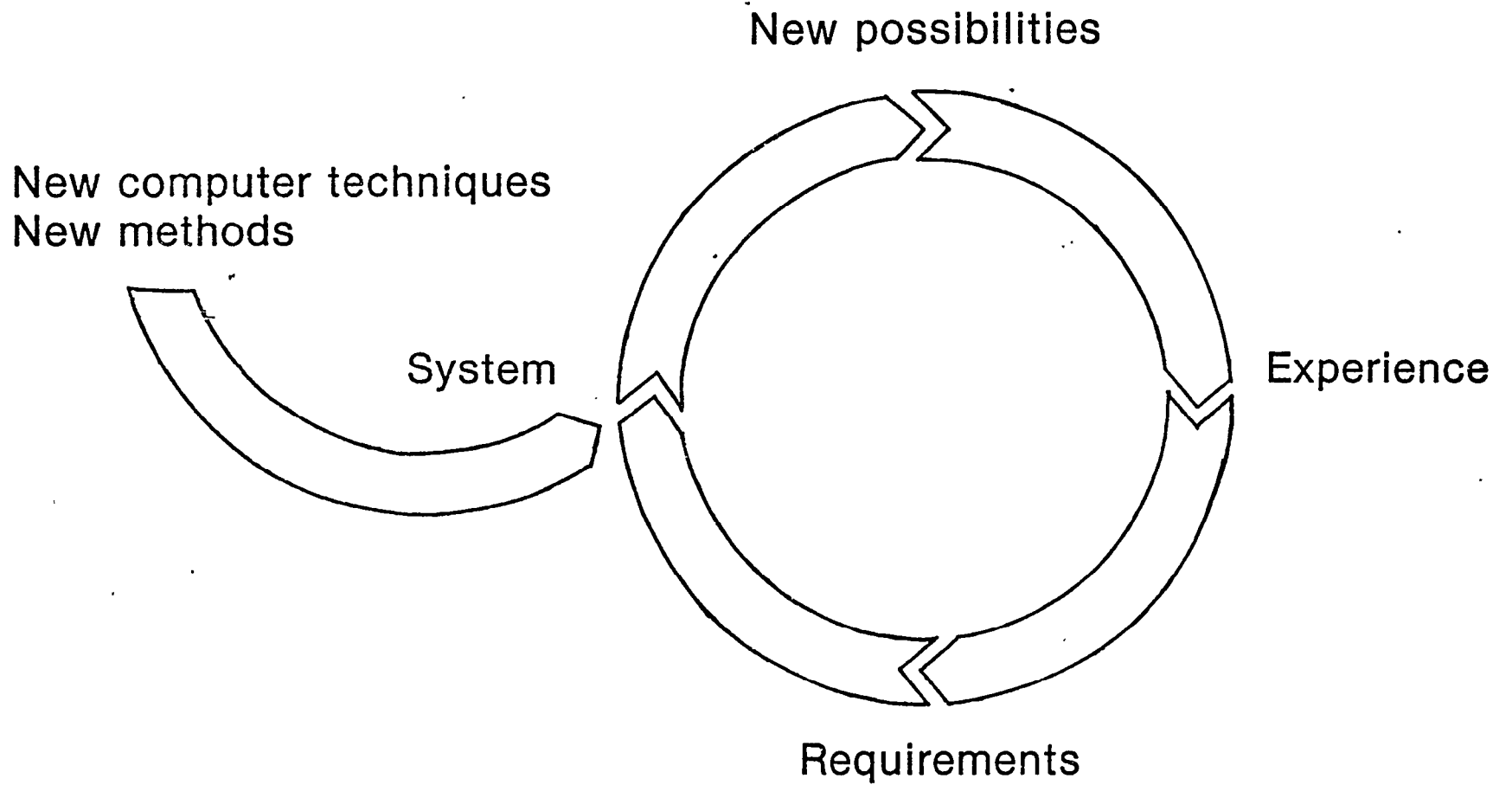
Drawing oriented system



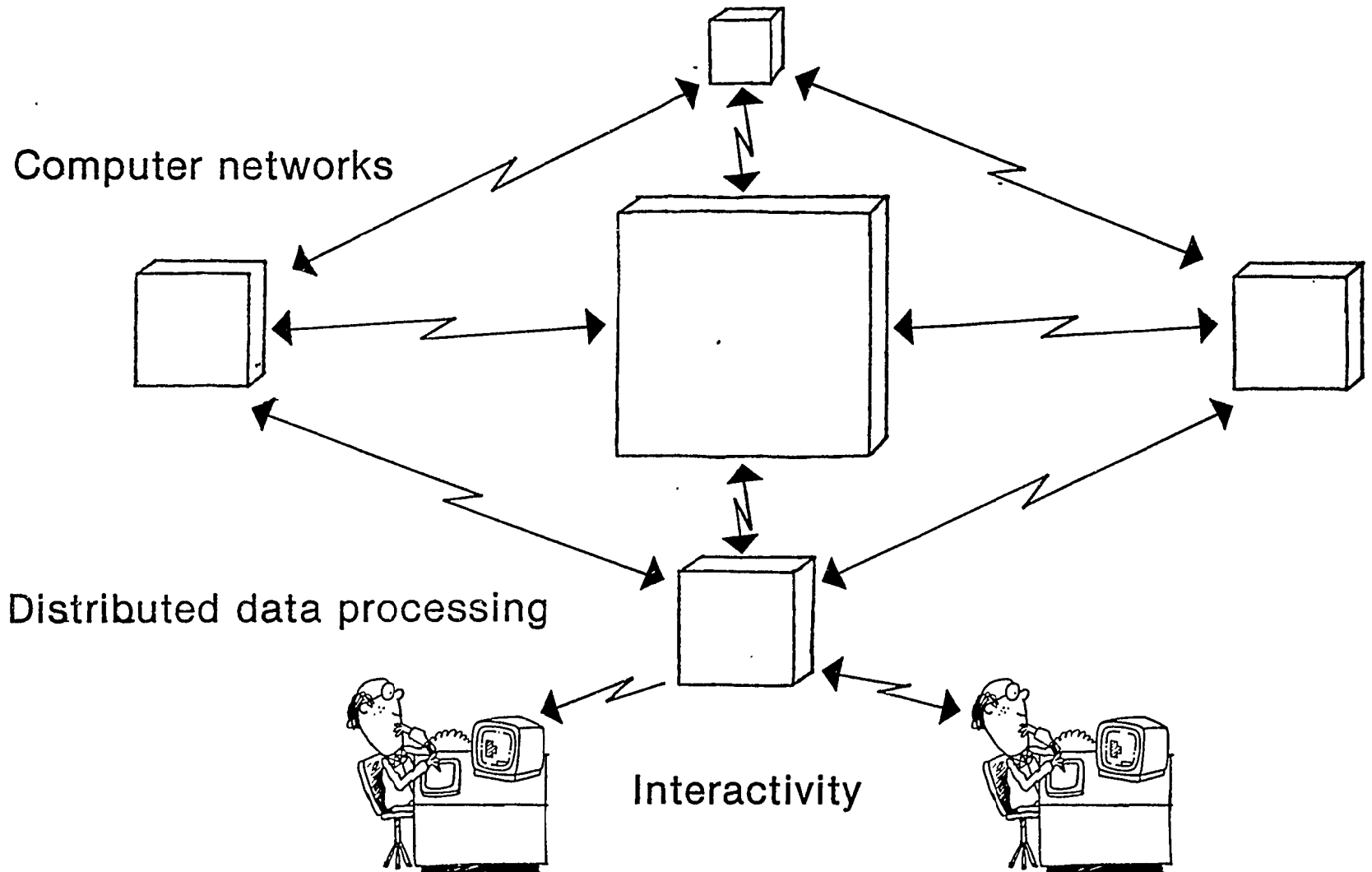
Product oriented system



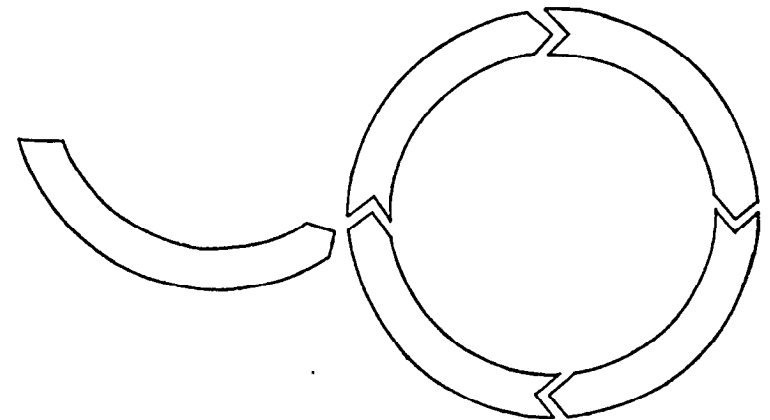
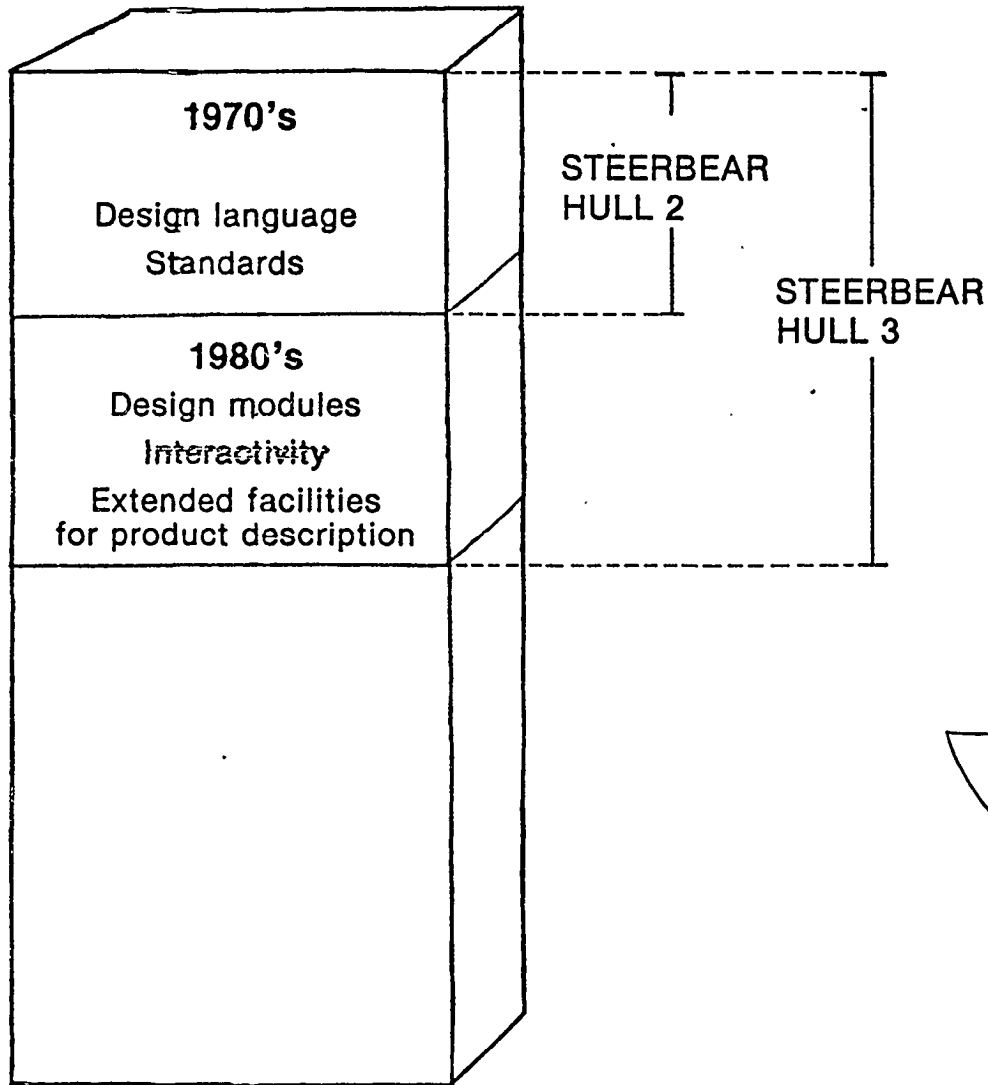
Why a New System?



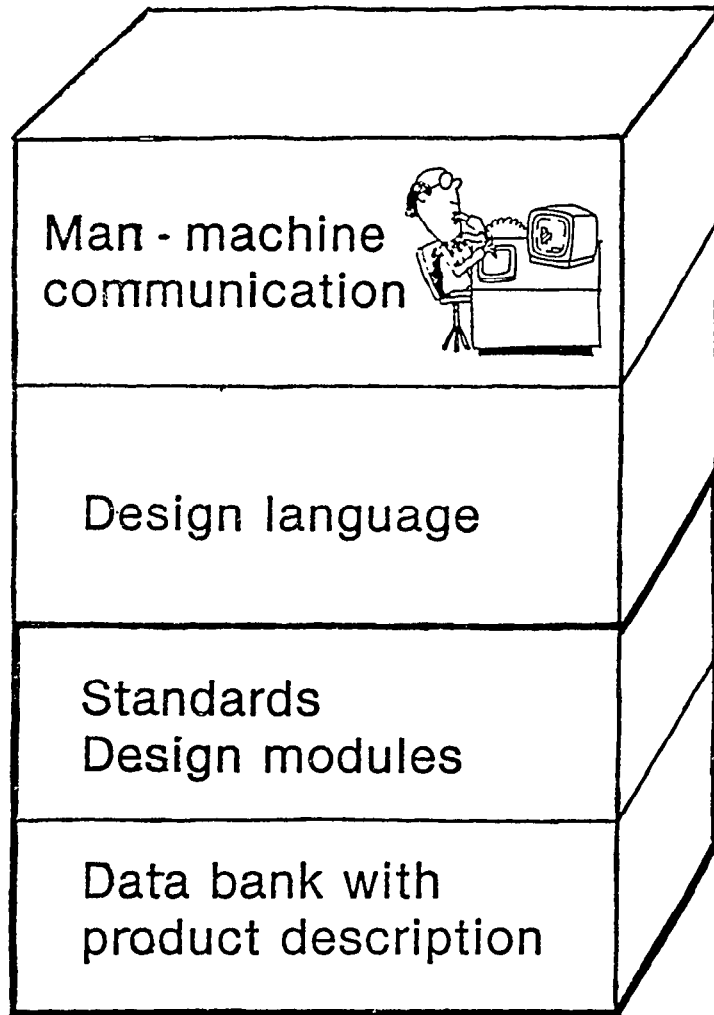
New Computer Techniques



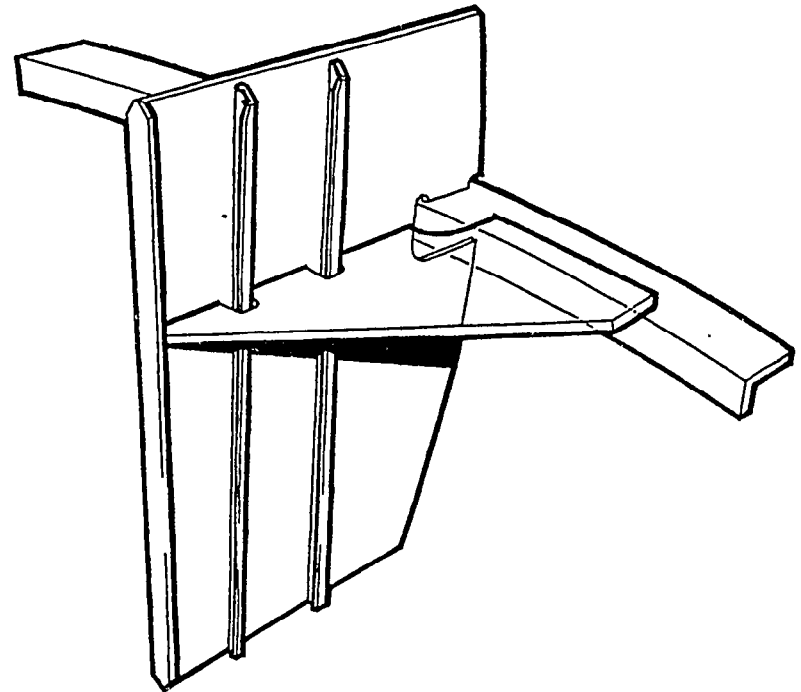
Engineering Workload Reduction



System Components



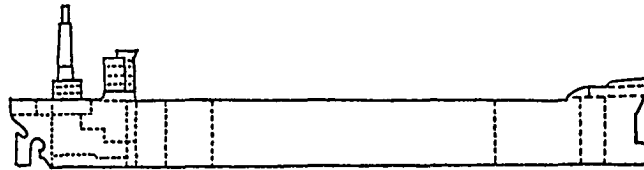
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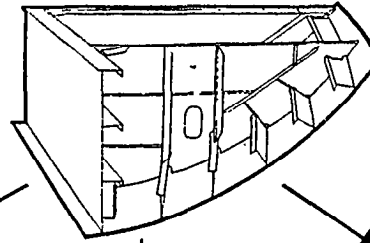
BRACKET, A, L27, AFT,
MTRL = 23, QUAL = B, POS = 124;

New Methods

PRODUCT DESCRIPTION:

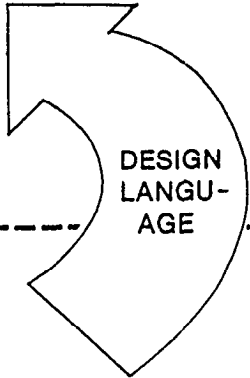
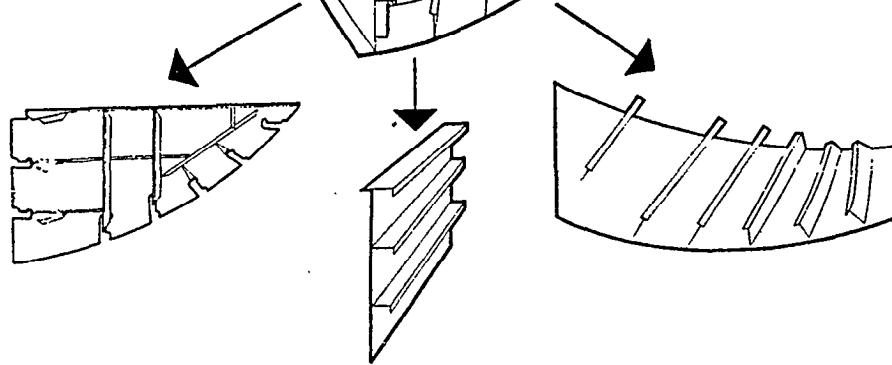


Units



Absolute units,
unique for each
ship

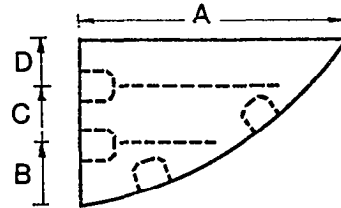
Panels



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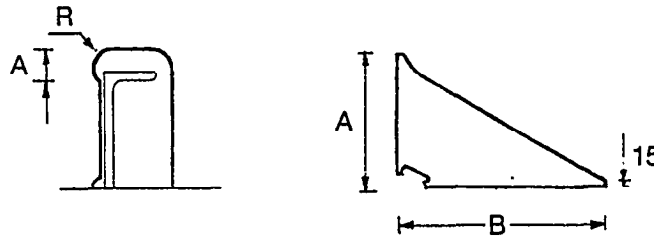
RULES FOR:

Design modules

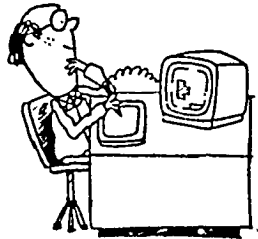


Parametric units,
universal

Standards



Design Modules



Design language

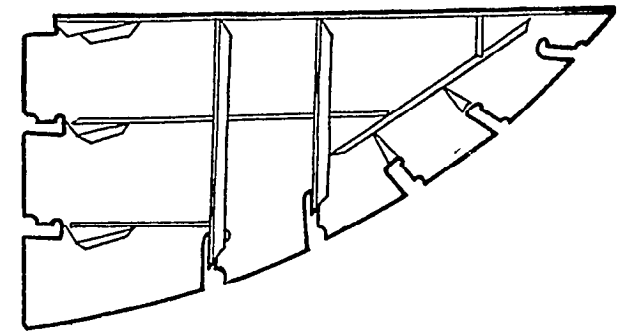
Parameters,...

Design module

Principle description of a bottom web

Surrounding geometry

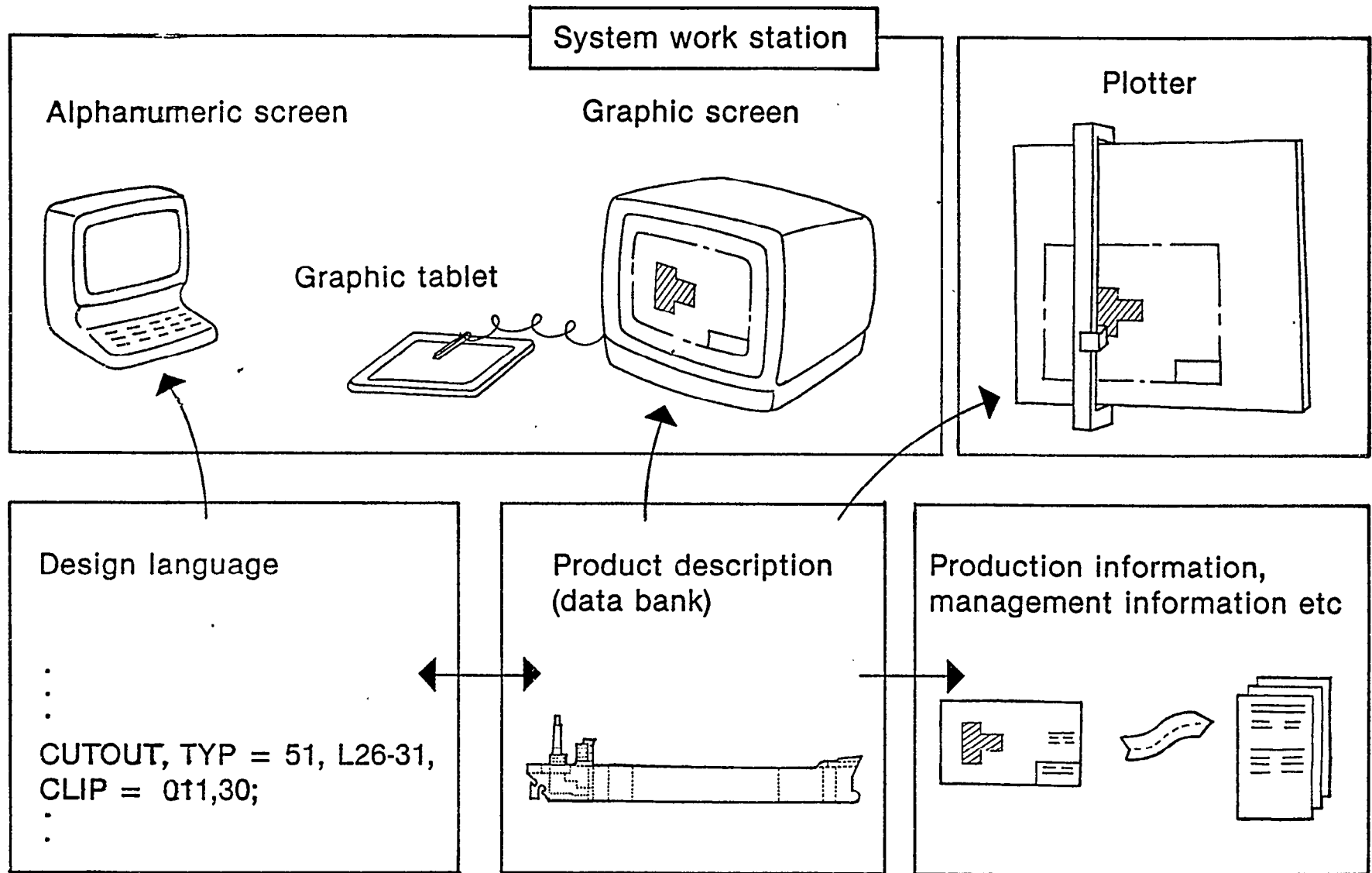
Standards



Unique bottom web

System Concept

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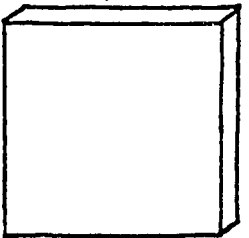
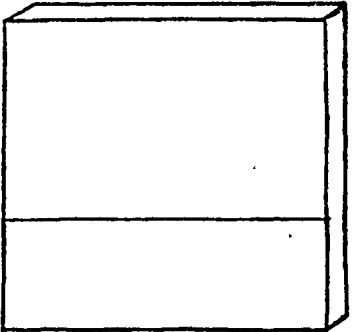
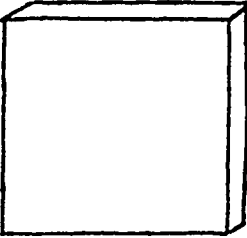
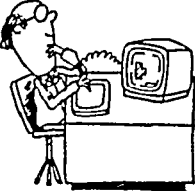
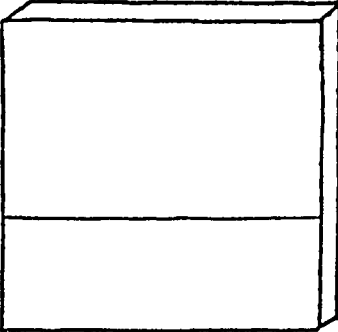
Hardware Configuration - Alternatives

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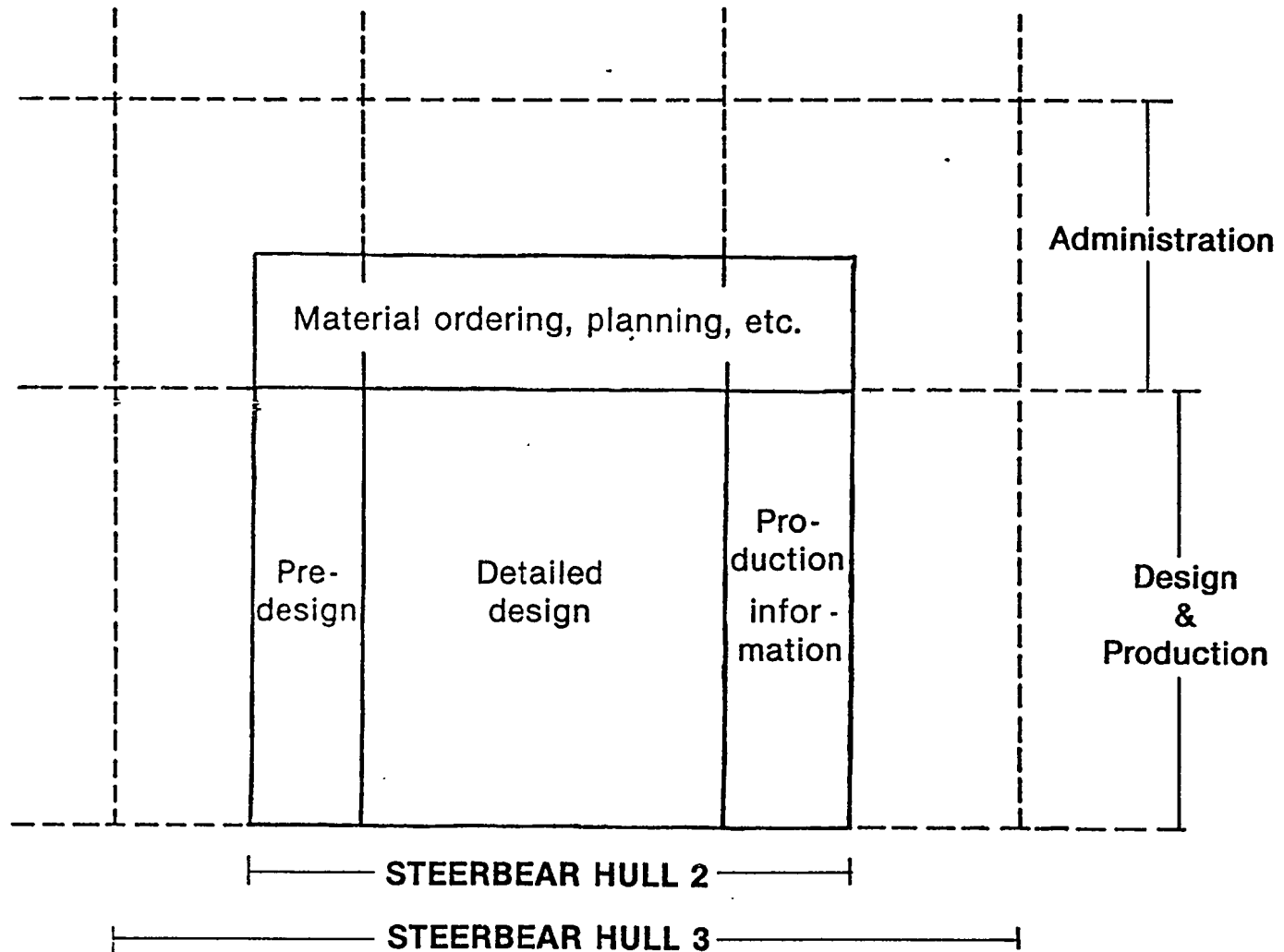
Main frame

Mini

System work station incl. micro

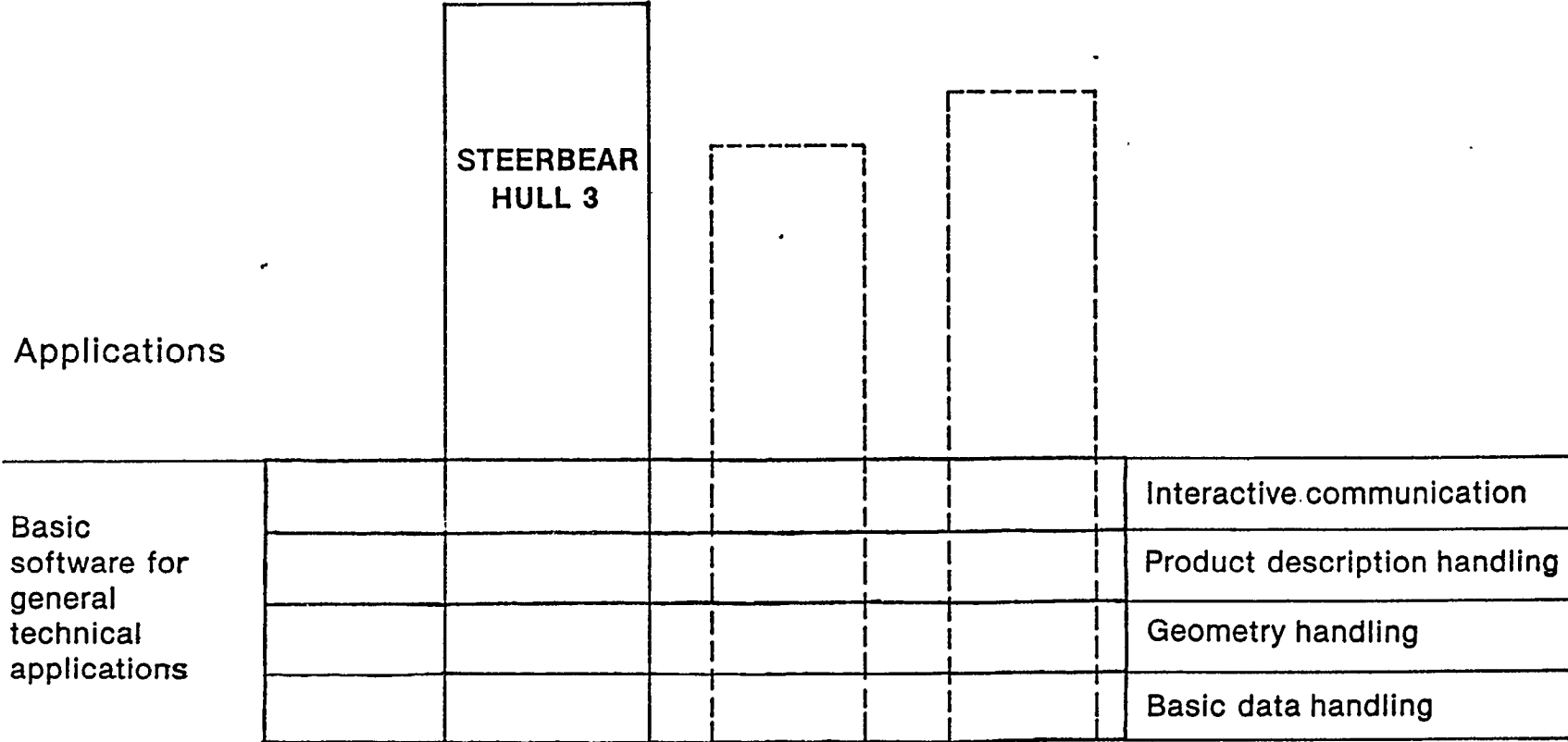


New Functions in STEERBEAR HULL 3



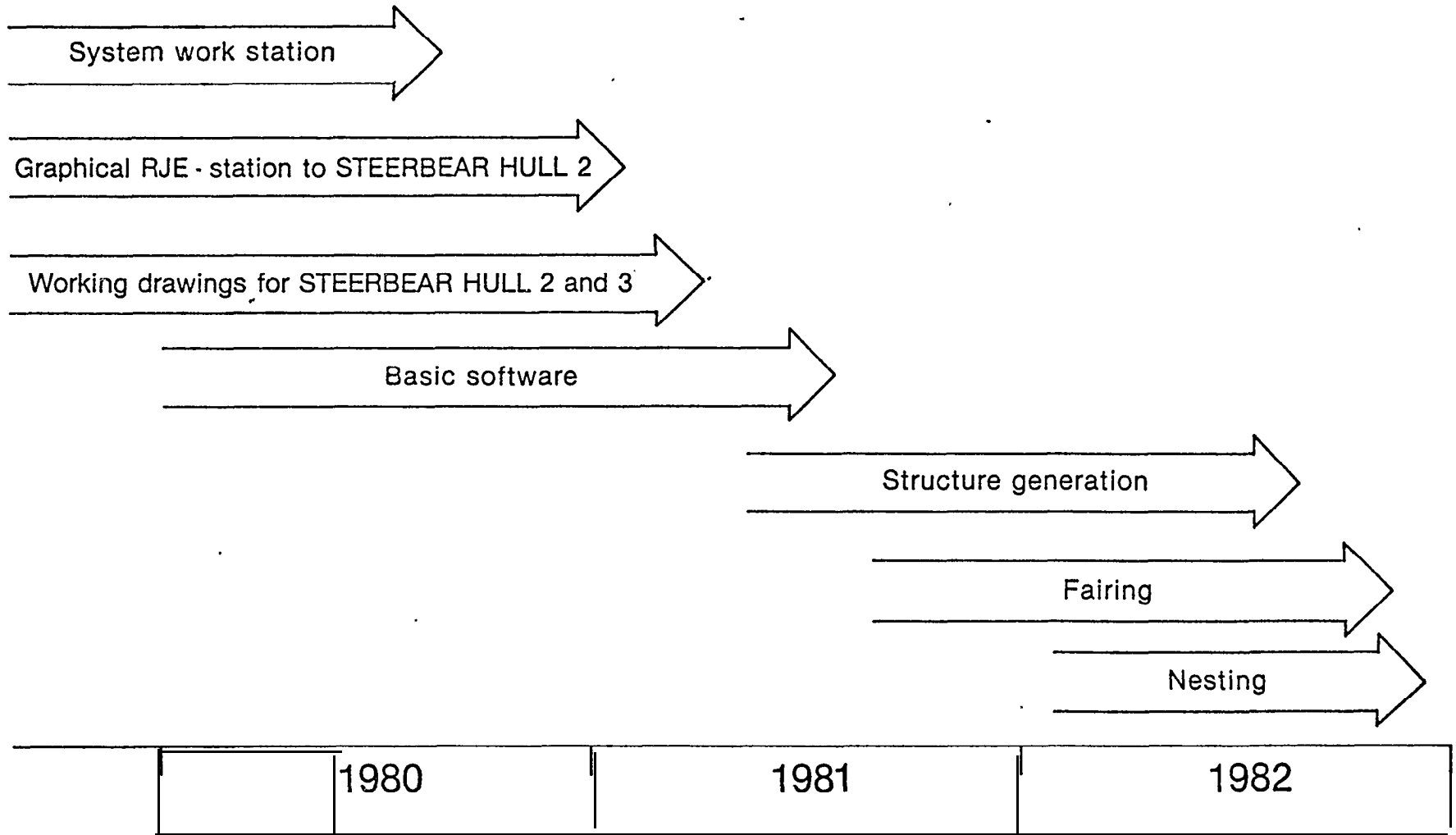
System Development

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**Implementation Schedule for
STEERBEAR HULL 3**

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