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Paper No. 7: Computer-Aided Design Systems Applied to Ship Piping Design

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

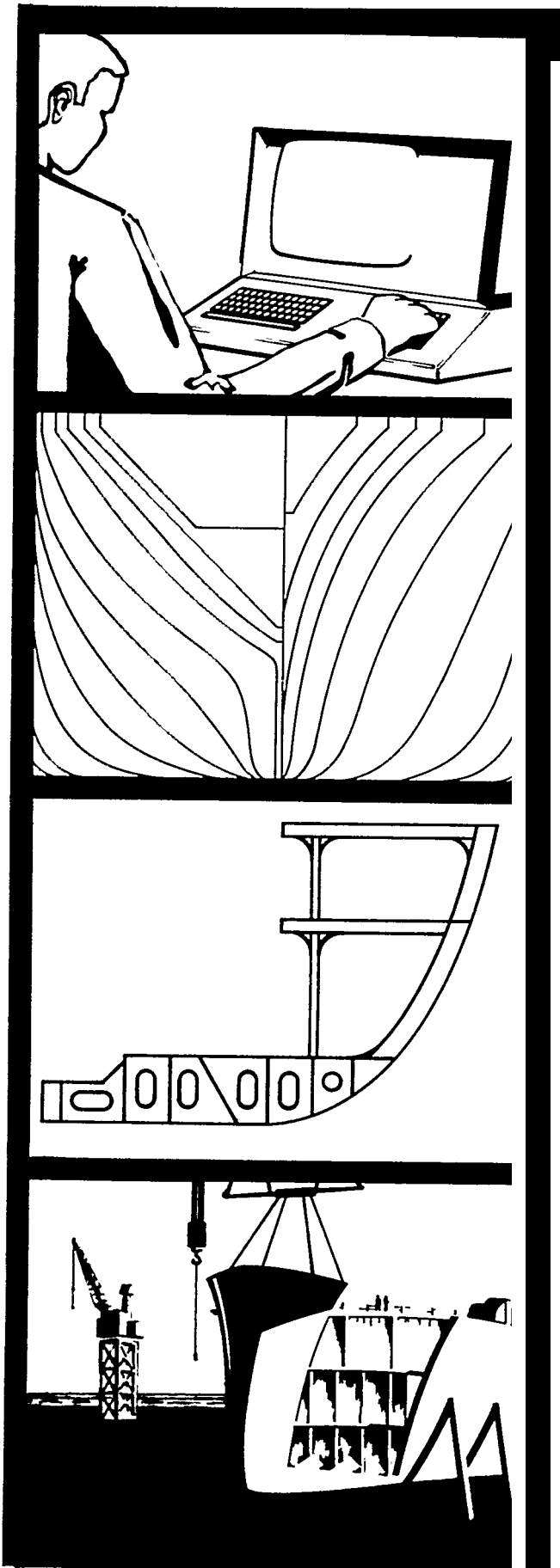
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THREE GENERATIONS OF COMPUTER ASSIST TO
PIPING

BATCH SYSTEMS

INTERACTIVE DRAFTING SYSTEMS

INTERACTIVE DESIGN SYSTEMS

CHARACTERISTICS OF BATCH SYSTEMS

RECORD INPUT

CUMBERSOME EDITING

PIPING DATABASE

INFLEXIBLE OUTPUT

CHARACTERISTICS OF INTERACTIVE DRAFTING

EASY EDITING

ARCHIVE QUALITY PLOTS

LINES-ON-PAPER DATABASE

LIMITED DATA CAPTURE

LIMITED 3-D CAPABILITY

CHARACTERISTICS OF INTERACTIVE DESIGN

- BEST OF BOTH -

EASY EDITING

TRUE 3-D

GENERALIZED DATABASE

OUTPUT REPORT LANGUAGE

DESIGN RULES CHECKING

MULTI - APPLICATION

INTERFACE TO OTHER SYSTEMS

GENERALIZED DATABASE IS KEY TO GROWTH

GRAPHICAL DATA

NON-GRAPHICAL DATA

USER-DEFINED DATA

DATA INDEPENDENCE

DATA EXTRACTION

3-D DESIGN PROCESS

STRUCTURE, COMPARTMENTALIZATION

MAJOR EQUIPMENT LOCATION

RUN LINES BASED ON SYSTEM SCHEMATIC

INSERT COMPONENTS

OUTPUTS FROM INTERACTIVE DESIGN SYSTEM

ARCHIVE QUALITY DRAWINGS

BILLS OF MATERIAL

FROM-TO LISTS

ISOMETRIC, ORTHOGRAPHY C, AND DETAIL PLOTS

MASS PROPERTIES

DATA FOR OTHER SYSTEMS

USER DEFINED REPORTS

OTHER COMPUTER SYSTEMS THAT CAN USE
DATA FROM INTERACTIVE DESIGN

BATCH PIPING

INTERFERENCE ANALYSIS

STRESS ANALYSIS

SIMULATION

MASS PROPERTIES ACCOUNTING

FINITE ELEMENT ANALYSIS

MULTI -APPLI CATI ON-ADVANTAGES

PURCHASE ECONOMY

SHI FTI NG WORKLOAD

UNI FI ED DATABASE

EASI ER TRAI NI NG

MULTI -APPLI CATI ON-EXAMPLES

P I P I N G

WI RI NG DI AGRAMS

MECHANI CAL DESI GN

S T R U C T U R A L

NUMERI CAL CONTROL

FINI TE ELEMENT MODELING

TECHNI CAL ILLUSTRATION

P A R T N E S T I N G

OFF-THE-SHELF VS CUSTOM BUILT SYSTEMS

ADVANTAGES OF OFF-THE-SHELF SYSTEMS

LOWER COST

READY AVAILABILITY

SUPPORT AND DEVELOPMENT

WIDE USER BASE

DISADVANTAGES

DOESN'T DO EXACTLY WHAT YOU WANT

SOLUTION

USER ADAPTABLE SYSTEMS

CONCLUSION

OFF-THE-SHELF THIRD GENERATION INTERACTIVE

DESIGN SYSTEMS ARE THE RIGHT STARTING POINT

FOR AUTOMATING THE SHIP PIPING DESIGN PROCESS

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