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VOLUME I



INSTITUTE FOR RESEARCH AND ENGINEERING FOR AUTOMATION AND PRODUCTIVITY IN SHIPBUILDING

I R E A P S

CASA: A SYSTEM FOR COMPUTER AIDED SHIP ACCOMMODATION

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Dr. Banda is currently responsible for defining strategies of the company in the technical applications field from the hardware and software point of view. He has spent the majority of the last 10 years managing software projects for basic and detailed design of ships.

Dr. Banda holds PhD degrees in naval architecture and in mechanical engineering. He has been appointed to the International Organizing Committee of ICCAS.

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Dr. Di Filippo is currently responsible for the design and development of a system for the general arrangement plan known as GAP. He previously served as project leader of the CASA system.

Dr. Di Filippo holds a PhD degree in mechanical engineering.

ABSTRACT

The Computer Aided Ship Accommodation (CASA) system is very advanced in the field of automatic design. CASA has been planned for the production of drawings of high graphic quality, the relevant bill of material, and the preparation of the workshop documentation. The system uses interactive graphic techniques to facilitate both the man-machine communication and to increase the throughput and flexibility of the programs.

CASA has three main modules: (1) Description of standards is handled in batch mode. In this case the input concerns standard materials description and general selection rules. These data are stored into the database of the system; drawings and lists are also provided. (2) Description of ship design data. From structural drawings the main data are loaded into the computer for further processing. All the operations of this phase are considerably simplified (thanks to a particular "user-oriented" language) and do not require specific knowledge of EDP. Relevant output drawing will constitute the basic layout of accommodation. (3) Interactive automatic design. From description of construction data and standards with the aid of interactive functions of CASA, "automatic" and "interactive" design are developed. Automatic design, which foresees data processing for each constructive detail, is completely handled in its initial phase in batch mode. Interactive design allows corrections and modifications of data and programs with immediate feedback, thus giving the operator the possibility of a quick and easy communication with the computer.

The problem

Furnishing of naval superstructures includes: localization and -definition of habitable volumes, their subdivisions in cabins, service rooms, rooms for common use etc., definition of materials needed for construction of all this and for furnishing of all rooms; preparation of all drawings and lists necessary for orders, construction, and fitting up on board. This activity, which is gratifying for a creativity aspect in the phases of design and furnishing definition, becomes extremely boring in the successive phase concerning detailed specification of the thousands of components necessary.

The solution

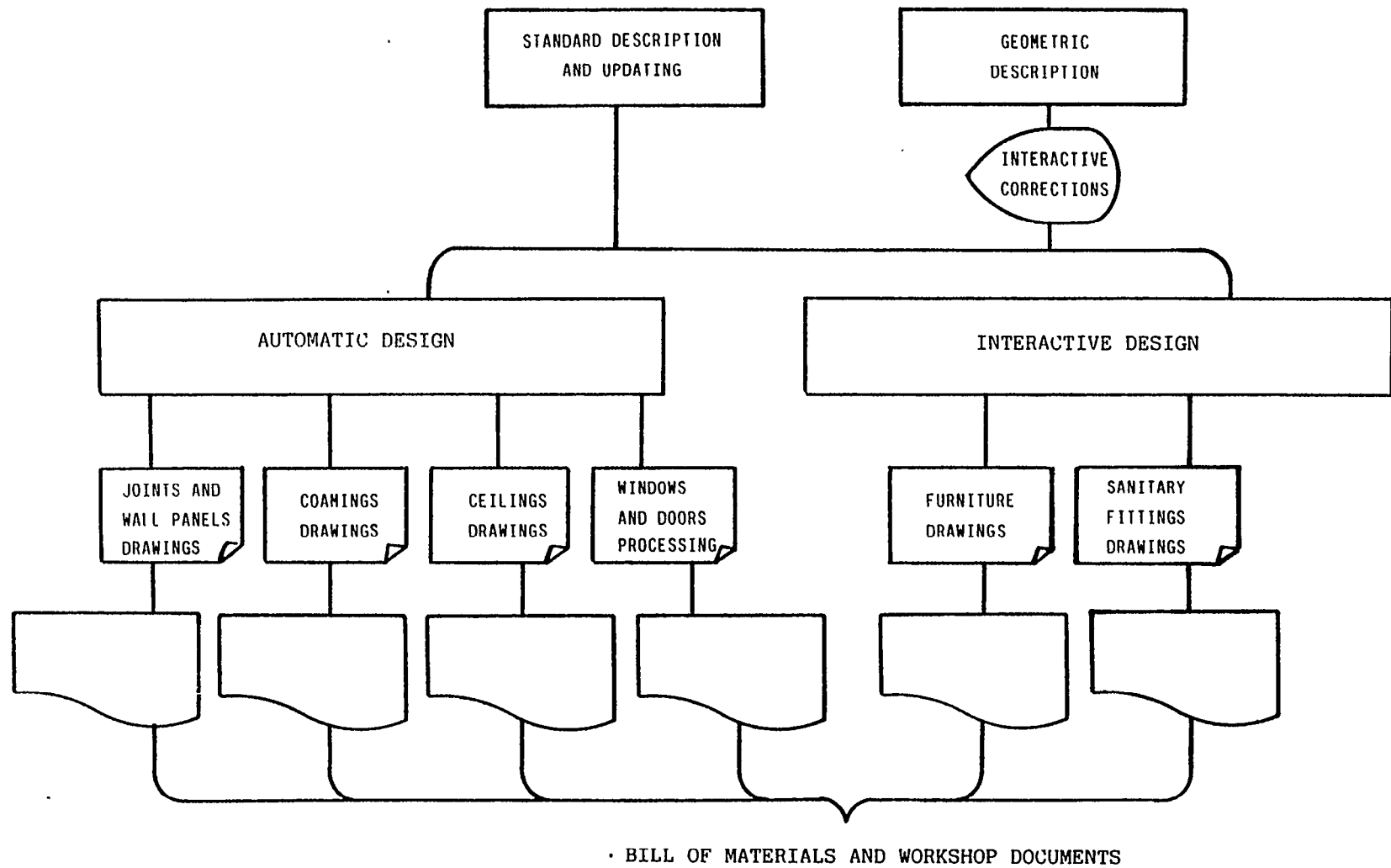
The CASA (Computer Aided Ship Accomodation) without interfering with designer's creativity, and helping instead the designer with ease of execution in his choice among many alternatives, automatically produces all drawings consequent upon design activities, subdivides furnishing elements in elementary components, prepares materials lists and automatically produces all work-shop documents.

CASA SYSTEM

The CASA system is subdivided into three principal modules:

- STANDARDS DESCRIPTION
- GEOMETRIC DESCRIPTION OF SHIP AND AUTOMATIC DESIGN
- DESIGN IN THE INTERACTIVE MODE

CASA SYSTEM GENERAL FLOW



STANDARD DESCRIPTION

At the basis of any computer data handling there is always a high standardization of material to be handled.

But standardization introduces into design a rigidity factor which, if it is not carefully estimated, may considerably reduce the utility of the software tool.

The CASA management of standards has overcome this obstacle by allowing to insert, cancel and modify the standardized elements by simple draftsmen operations.

The most important furnishing elements to be codified are: doors, walls, ceilings, sidelights, windows, furniture, sanitary fittings, profiles of walls and ceilings, support furrings, coamings, etc.

All standardized materials are completed with a code which foresees on easy identification of the product and of its components from the order to the reception, manufacturing and installation on board.

The data-base of standards stores the codes and data regarding the materials to be used in all ships.

For every new ship the general standards are examined and if necessary integrated or modified.

In the standards data-base are also stored the graphic elements which appear in the drawings such as: beds, tables, chairs etc.

GEOMETRIC DESCRIPTION OF THE SHIP

The first phase of this job consists of description of all geometric and topographic features of all furnishing elements and of all structures which are essential for the successive design work.

Subdivision into decks

The ship's superstructures are subdivided into decks and the relevant data are stored deck by deck.

The elements and structures to be stored are:

- steel walls
- internal furnishing walls
- web frames
- girders
- stiffeners
- pillars
- sidelights and windows
- doors
- reference lines
- blocks subdivision lines

The first result of the work performed is a plan obtained by plotter visualizing all input data.

DECK JOB ORDER CODE

- ZONE

DELT.IL DATI

ELTUT7 HLIG73 31/25-12:04:08 (1.0)

000001 000 (001) 4343 (74) U DECK

000002 000 INPUT

000003 000 ORIGIN R031

000004 000 PARETI L MET 0 10080 12800 PIU08

000005 000 PARETI T MET 10080 12800 -10080 PIU08

000006 000 PARETI L MET 12800 -10080 U MEN08

000007 000 PARETI T MET -10080 0 10080 MEN08

000008 000 PARETI L MET R041 5040 R047 PIU06 S

000009 000 PARETI L MET R031 5040 R032 000700 PIU06

000010 000 PARETI T MET 5040 R039 -5040 MEN06

000011 000 PARETI L MET P033 000050 -5040 P031 MEN06

000012 000 PARETI T MET -1680 R036 3440 PIU06

000013 000 PARETI T MET -1680 R035 -2750 MEN06

000014 000 PARETI L MET R035 -2750 R035 000200 PIU06

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000016 000 PARETI L MET R035 000200 -4640 R035 000075 MEN06

000017 000 PARETI L MET P035 000200 -4240 R037 MEN06

000018 000 PARETI T MET -5040 R037 -3440 MEN06

000019 000 PARETI L MET R037 -3440 R038 MEN06

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000022 000 PARETI L MET P035 3480 R037 PIU06

000023 000 PARETI T MET 3480 R037 5040 PIU06

000024 000 PARETI L MET R035 -1680 R039 MEN06

000025 000 PARETI L MET R034 000200 5040 R039 PIU06

000026 000 PARETI L MET R034 000350 -5040 R039 MEN06

000027 000 PARETI L MET R038 -3440 R039 PIU06

000028 000 PARETI T MET 200 R039 000260 -200 PIU08

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000030 000 PARETI L MET R039 200 R039 000260 PIU08

000031 000 PARETI L ARP 400 9600 12300 S

000032 000 PARETI T ARP 5100 S

000033 000 PARETI L ARP 7700 S

000034 000 PARETI T ARP 9600 7700 -9600

000035 000 PARETI L ARP 7700 4800 12300 S

000036 000 PARETI T ARP -4800

000037 000 PARETI L ARP 7700 1600 12300 S

000038 000 PARETI T ARP 9600 9200 6100 S

000039 000 PARETI L ARP 7700 S

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000042 000 PARETI L ARP 7700 3300 9200 S

000043 000 PARETI T ARP 4800 S

000044 000 PARETI L ARP 7700 100 9200

000045 000 PARETI T ARP 1600

000046 000 PARETI L ARP 0 6100 7700 S

000047 000 PARETI T ARP 6100 400 9600

000048 000 PARETI T ARP 5100 1500 6100 S

000049 000 PARETI T ARP 6100 4400 9600 S

000050 000 PARETI T ARP -9600 400 -7600

000051 000 PARETI T ARP -6100 300 -6900

000052 000 PARETI T ARP -7600 1600 -6100

000053 000 PARETI L ARP 300 -7600 1800

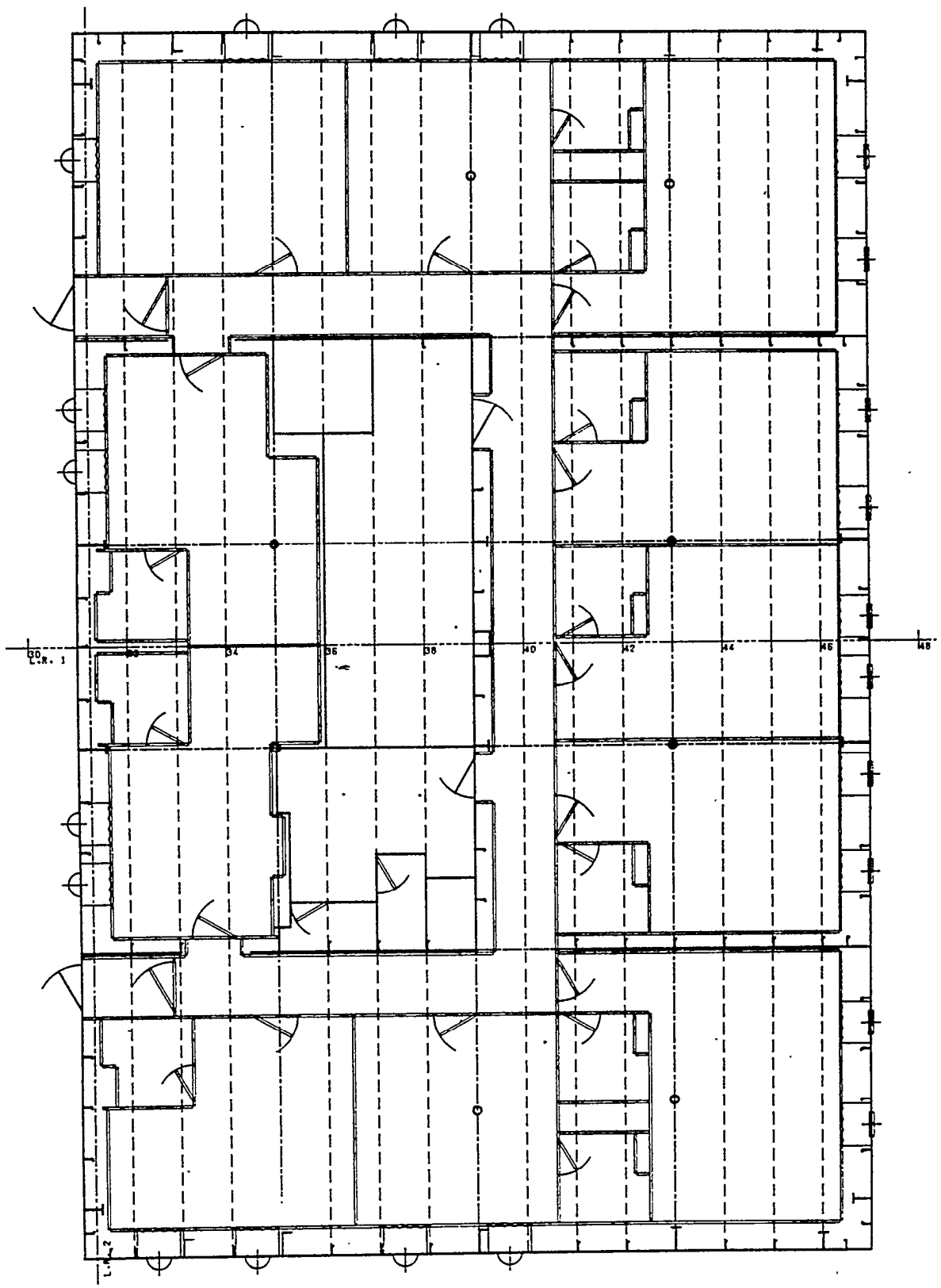
000054 000 PARETI L ARP R031 5100 R033

000055 000 PARETI L ARP 0 -5100 1700

ELEMENT NAME

ELEMENT TYPE

ELEMENT'S CO-ORDINATES



Interactive correction of data	In this phase it is already possible to intervene in the interactive mode; in fact, using a graphic interactive screen the basic data(as bulkheads, sidelights , or doors) can be simply and immediately corrected.
Menii ,	In order to free the operator from the need to acquire knowledge of the computer operating system, a command table (MENU') is visualized on the screen to facilitate all operations of communication with the computer.
Ease of communication with the computer	By setting the screen cross-hair, on one of the menu rectangles, the program is set to perform all required operations.
Data safety	In the working phases the system, in order to avoid unintentional damages of data by the user, operates on temporary files which are created each time , while the ship file is used only in the reading and up-dating phases.
Output facilities	By utilization of the command table, it is also possible to address the stored data to any external support: graphics screens, pen-plotters and printer plotters.

AUTOMATIC DESIGN

Procedure for panels, bulkheads, and joints	After all data are stored and checked, the successive procedures of automatic design are utilized. CASA automatically subdivides into panels, with modular criteria, all internal furnishing walls. According to the colour and the type of wall they belong to, it classifies and marks all panels, classifies and marks all joints; it produces according to specific criteria of scrap reduction, the cutting schemes for panelling, the plan for joints and all materials lists necessary for order and installation of relevant materials .
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Wall panels nesting
booklet

These lists are obtained by an automatic procedure starting from the data relevant the decks to be processed and materials to be employed in the construction of the panels.

The following pages show the scheme to be used in the workshop for cutting panels, the scrap of **materials**, the total quantity of the panels to be made per lot and the total average scrap.

ITALCANTIERI TEC/ARR		CINEMA TAGLIO PANNELLI PARETI				WALL PANELS NESTING		MODIFICHE			N° FOGLIO	
COMPIATO XII		STAB.	NO	DATA	03/02/78	COSTR	4343	LOTTO N.	INDICE	NOME	DATA	2
PANNELLI SERIE N. 1		PANNELLI PREPLACCATI - LARGHEZZA : 1170 --- ALTEZZA : 2160// TOTALE PEZZI DELLA SERIE: 6										
RIVESTIMENTO												
SCHEMA N. 1		PANNELLI NORMALI ETERNAVE - INNER PANELS (MATERIALS) - SCRAPS										
PLACCATURA :												
LANTIER		LARGH 1170 - PANEL WIDTH										
LPR104		MARCA 611K - STANDARD PIECE-NUMBER										
SCHEMA N. 2		PANNELLI NORMALI ETERNAVE - PEZZI										
PLACCATURA :												
LANTIER		LARGH 1070 - SERIO 100										
LPR104		MARCA 611K - PEZZI 3										
COVERING MATERIAL												
SCHEMA N. 3		PANNELLI NORMALI ETERNAVE										
PLACCATURA :												
LANTIER		LARGH 670 270 - SERIO 230										
LPR104		MARCA 607K 603K - PEZZI 1										

The withdrawal notes are automatically obtained.

The withdrawal notes are automatically obtained. They contain the information to withdraw, the material necessary for the construction of the wall panels.

ITACANTIERI TEC/ARR		SCHEMA TAGLIO PANNELLI PERFETTI		COSTR. 4343		LOTTO N. 1		MODIFICHE			N.° FOGLIO
COMPIUTO		STAG. 110		DATA 03/02/78		ZONA 74		INDICE	NOME	DATA	211
XII		0810				DIS. 3/057					

PANEL QUANTITY PER LOT

TOTALE PANNELLI DELLE VARIE MARCHE E LUNGHEZZE DA ESEGUIRE PER QUESTO LOTTO 250

SFRIDO MEDIO DOVUTO A TAGLI SEGA ED A RITAGLI NON UTILIZZABILI 10.306%

AVERAGE SCRAP

ITALCANTIERI TEC/ARR		PANNELLI DI TIPO: OMOGENEO		COSTR. 4343		LOTTO N. 1		MODIFICHE		N.° FOGLIO	
COMPILATO: XH		STAB. HO		CAP. ART. 0810		ZONA DIS. 74. 3/057		INDICE		NOME	
				DATA 03/02/78							

JOB ORDER CODE

MATERIAL WITHDRAWAL NOTES

FAI	COSTR.	CAP	ART	VOCE	LOTTO	BUONI	PRELIEVO	MATERIALI PER ESECUZIONE	PAG.
401	4343	0810						PANNELLI PARETI DELLA SERIE N. 1	1

FAI	COSTR.	CAP	ART	VOCE	LOTTO	BUONI	PRELIEVO	MATERIALI PER ESECUZIONE	PAG.
401	4343	0810						PANNELLO DI CERNAVE	1

FAI	COSTR.	CAP	ART	VOCE	LOTTO	BUONI	PRELIEVO	MATERIALI PER ESECUZIONE	PAG.
401	4343	0810						PANNELLO DI CERNAVE	1

FAI	COSTR.	CAP	ART	VOCE	LOTTO	BUONI	PRELIEVO	MATERIALI PER ESECUZIONE	PAG.
401	4343	0810						PANNELLO DI CERNAVE	1

FAI	COSTR.	CAP	ART	VOCE	LOTTO	BUONI	PRELIEVO	MATERIALI PER ESECUZIONE	PAG.
401	4343	0810						PANNELLO DI CERNAVE	1

FAI	COSTR.	CAP	ART	VOCE	LOTTO	BUONI	PRELIEVO	MATERIALI PER ESECUZIONE	PAG.
401	4343	0810						PANNELLO DI CERNAVE	1

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401	4343	0810						PANNELLO DI CERNAVE	1

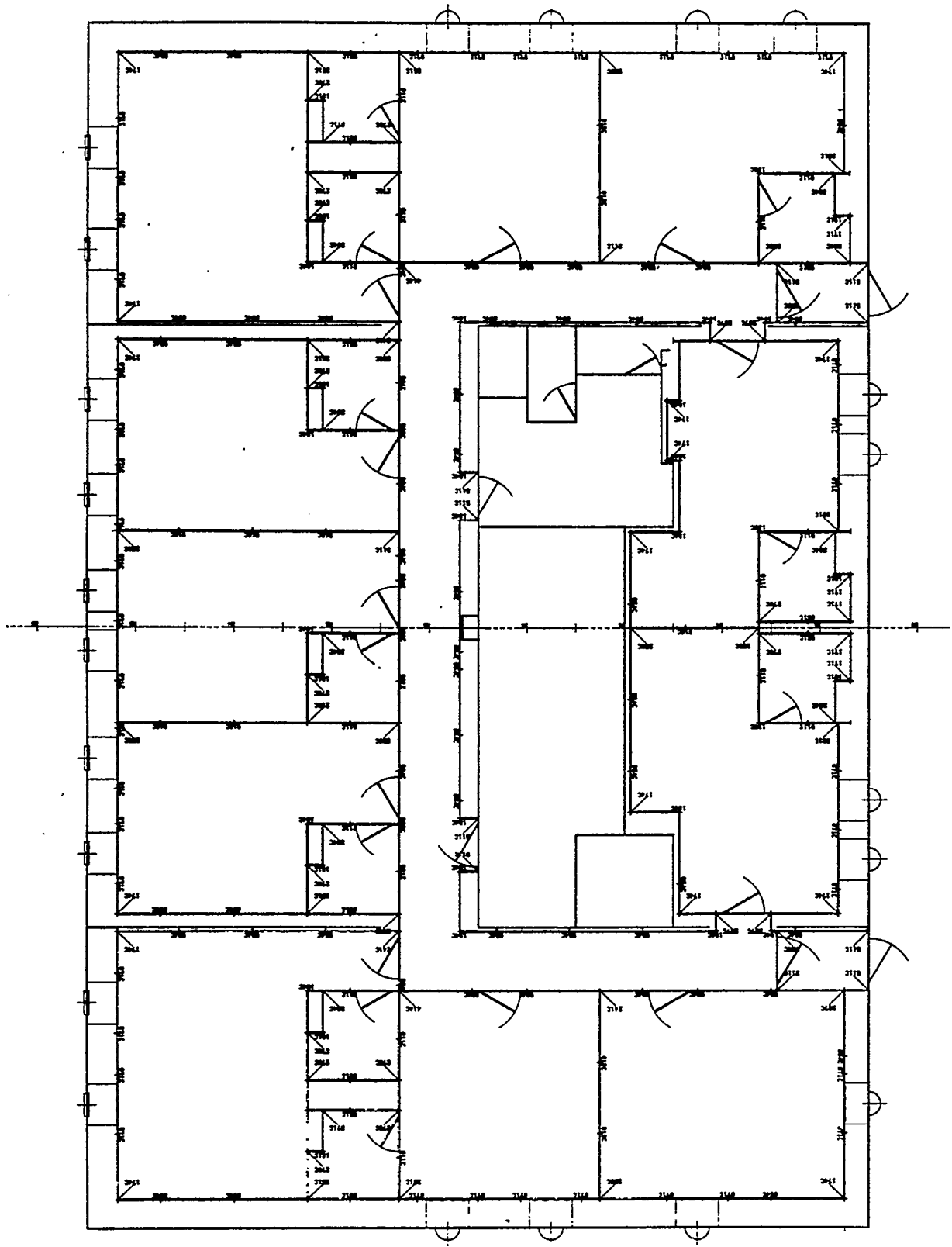
FAI	COSTR.	CAP	ART						

Summary of material
requisition order

This output shows the material summary of the wall-
panels relevant to a lot.

ITALCARTHEM TEC/ARR		CONSUNTIVO FABBRISOGNO PANNELLI PARETI				COSTR. 4343		LOTTO N. 1		MODIFICHE			N° FOGLIO																																	
COMPILATO: XII		STAB. HQ		GR	DATA 03/02/78	ZONA DIS. 74 3/057				INDICE	NOME	DATA	1/3																																	
<table border="1"> <thead> <tr> <th>ELEMENT NAME</th> <th>KIND OF WALL</th> <th>SIZE</th> <th>PIECES</th> </tr> </thead> <tbody> <tr> <td>PANNELLI DI LATERNALE</td> <td>PER PARETI NORMALI</td> <td>1170X2160</td> <td>PEZZI 87</td> </tr> <tr> <td>PANNELLI DI LATERNALE</td> <td>PER PARETI DI CLASSE A</td> <td>1170X2160</td> <td>PEZZI 33</td> </tr> <tr> <td>PANNELLI DI LATERNALE PER CONTROPLACCATURA PANNELLI NORMALI</td> <td></td> <td>1170X2160</td> <td>PEZZI 72</td> </tr> <tr> <td>PANNELLI DI LATERNALE PER CONTROPLACCATURA PANNELLI CLASSE B</td> <td></td> <td>1170X2160</td> <td>PEZZI 21</td> </tr> <tr> <td>PANNELLI DI LATERNALE PER PARETI NORMALI LOC.IG.PREALL.</td> <td></td> <td>770X2160</td> <td>PEZZI 66</td> </tr> <tr> <td>PANNELLI DI LATERNALE PER PARETI DI CLASSE B LOC.IG.PREALL.</td> <td></td> <td>770X2160</td> <td>PEZZI 8</td> </tr> <tr> <td>PANNELLI DI LATERNALE PER CONTROPLACCATURA PANNELLI LOC.IG.PREALL.</td> <td></td> <td>770X2160</td> <td>PEZZI 37</td> </tr> </tbody> </table>															ELEMENT NAME	KIND OF WALL	SIZE	PIECES	PANNELLI DI LATERNALE	PER PARETI NORMALI	1170X2160	PEZZI 87	PANNELLI DI LATERNALE	PER PARETI DI CLASSE A	1170X2160	PEZZI 33	PANNELLI DI LATERNALE PER CONTROPLACCATURA PANNELLI NORMALI		1170X2160	PEZZI 72	PANNELLI DI LATERNALE PER CONTROPLACCATURA PANNELLI CLASSE B		1170X2160	PEZZI 21	PANNELLI DI LATERNALE PER PARETI NORMALI LOC.IG.PREALL.		770X2160	PEZZI 66	PANNELLI DI LATERNALE PER PARETI DI CLASSE B LOC.IG.PREALL.		770X2160	PEZZI 8	PANNELLI DI LATERNALE PER CONTROPLACCATURA PANNELLI LOC.IG.PREALL.		770X2160	PEZZI 37
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Mod. P4-113101 - 1/10/78 - 1/10/78



ITALCANTIERI TEC/ARR	DISTINTA QUANTITATIVI GIUNTI E RELATIVI COMPONENTI				COSTR. 4343	LOTTO N. 1	MODIFICHE			N° FOGLIO																					
							INDICE	NOME	DATA																						
COMPILATO: XII	TAB.	NO	0810	DATA 03/02/78	ZONA 74 "	DIS. 3/051				11																					
STANDARD PIECE-NUMBER SERIE II, 21 - MARCA 236C <u>MARCA COMPLETA PA*236JC</u> - COLORE COME <u>LPR358</u> - COMPLESSI DA ESEGUIRE <u>4</u> COMPONENTI: PEZZI PER COMPLESSO: N° TOTALE COMPONENTI: QUANTITY <table border="1"> <tbody> <tr> <td>PROFILO MARCA A009</td> <td>1</td> <td>4</td> </tr> <tr> <td>PROFILO MARCA A138</td> <td>1</td> <td>4</td> </tr> <tr> <td>PROFILO MARCA A070</td> <td>1</td> <td>4</td> </tr> <tr> <td>VITI AD 4.2X32 UNI 6956</td> <td>7</td> <td>28</td> </tr> <tr> <td>VITI M 925830 4.5X20</td> <td>26</td> <td>104</td> </tr> <tr> <td>TRECCIA AMIANTO 25X10 H=2180</td> <td>1</td> <td>4</td> </tr> <tr> <td>TRECCIA AMIANTO 25X3 H=2180</td> <td>1</td> <td>4</td> </tr> </tbody> </table>											PROFILO MARCA A009	1	4	PROFILO MARCA A138	1	4	PROFILO MARCA A070	1	4	VITI AD 4.2X32 UNI 6956	7	28	VITI M 925830 4.5X20	26	104	TRECCIA AMIANTO 25X10 H=2180	1	4	TRECCIA AMIANTO 25X3 H=2180	1	4
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COMPONENTS SERIE II, 22 - MARCA 031C <u>MARCA COMPLETA PA*031JC</u> - COLORE COME LPR358 - COMPLESSI DA ESEGUIRE 4 COMPONENTI: PEZZI PER COMPLESSO: N° TOTALE COMPONENTI: <table border="1"> <tbody> <tr> <td>PROFILO MARCA A009</td> <td>1</td> <td>4</td> </tr> <tr> <td>PROFILO MARCA A030</td> <td>1</td> <td>4</td> </tr> <tr> <td>GIRADOLE TIPO 461</td> <td>1</td> <td>4</td> </tr> <tr> <td>VITI AD 4.2X16 UNI 6956</td> <td>6</td> <td>24</td> </tr> <tr> <td>VITI AD 4.2X32 UNI 6956</td> <td>1</td> <td>4</td> </tr> <tr> <td>TRECCIA AMIANTO 25X10 H=2180</td> <td>1</td> <td>4</td> </tr> <tr> <td>TRECCIA AMIANTO 25X3 H=2180</td> <td>1</td> <td>4</td> </tr> </tbody> </table>											PROFILO MARCA A009	1	4	PROFILO MARCA A030	1	4	GIRADOLE TIPO 461	1	4	VITI AD 4.2X16 UNI 6956	6	24	VITI AD 4.2X32 UNI 6956	1	4	TRECCIA AMIANTO 25X10 H=2180	1	4	TRECCIA AMIANTO 25X3 H=2180	1	4
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Mod. 94.1113.01 - 10/1977

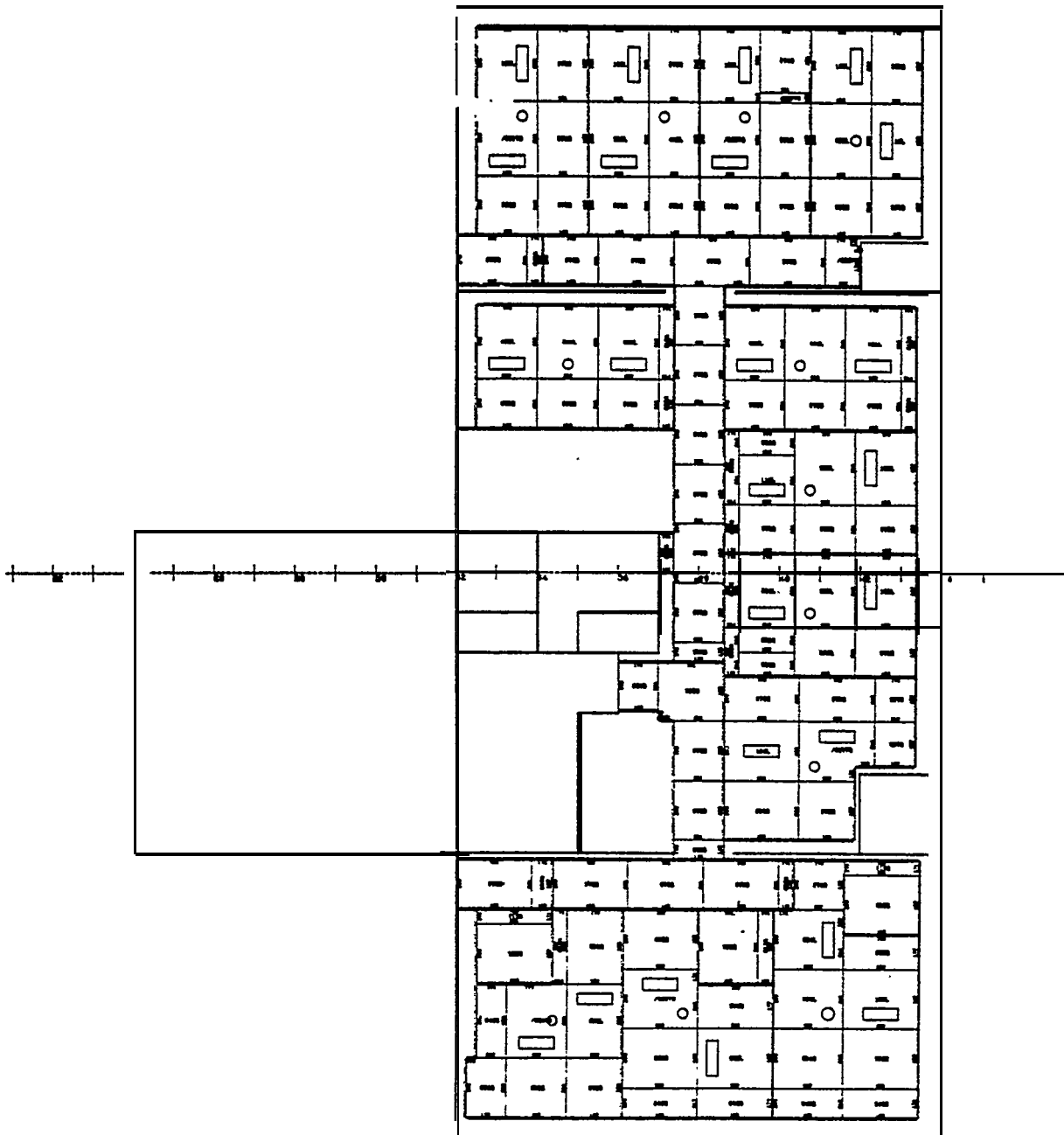
Procedure for ceiling panels

CASA, by working cabin by cabin, subdivides the ceiling into panels following a criterion aiming principally at reducing the junction profiles length and the number of non rectangular panels; the research of the best solution is automatic but it is always possible to introduce, by screen, preferential subdivision Lines and the system automatically fits the subdivision to the imposed lines.

After subdivision, individuation, and marking of panels, storing and marking is performed for profiles and support structural elements of the panels and of ceiling Lamps.

As automatic outputs we have:

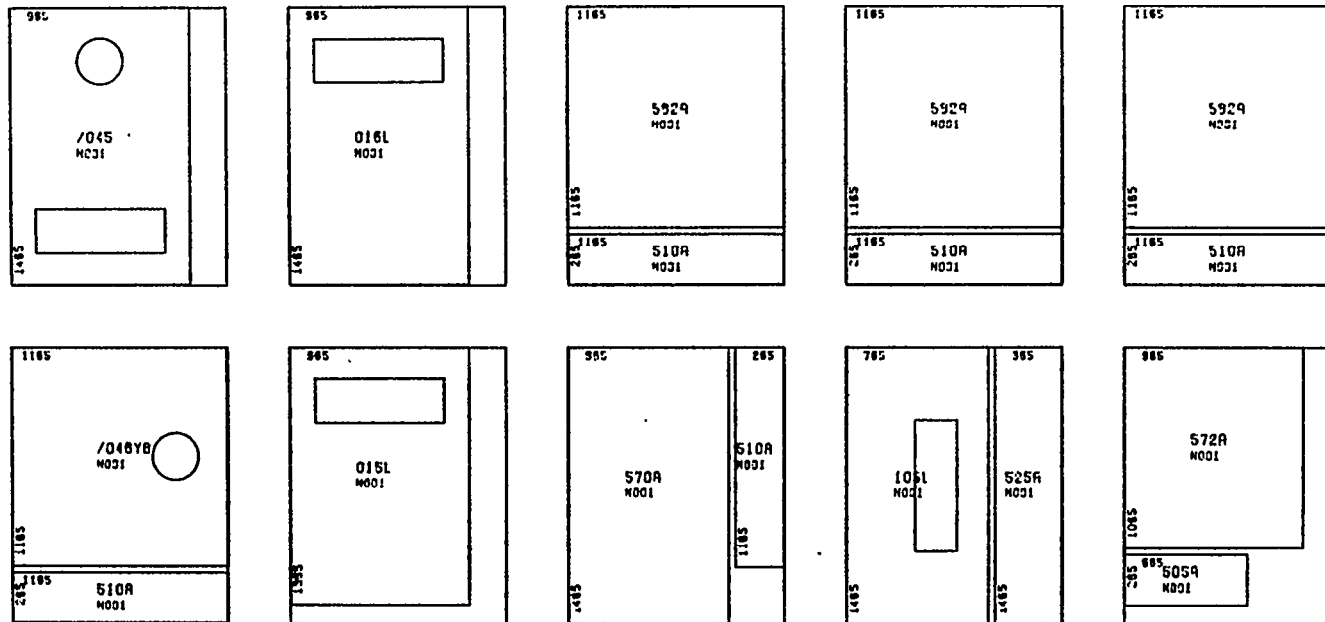
- plan for ceiling panelling
- plan for furrings
- panels nesting
- material lists for procurement, construction, and installation of materials on board.



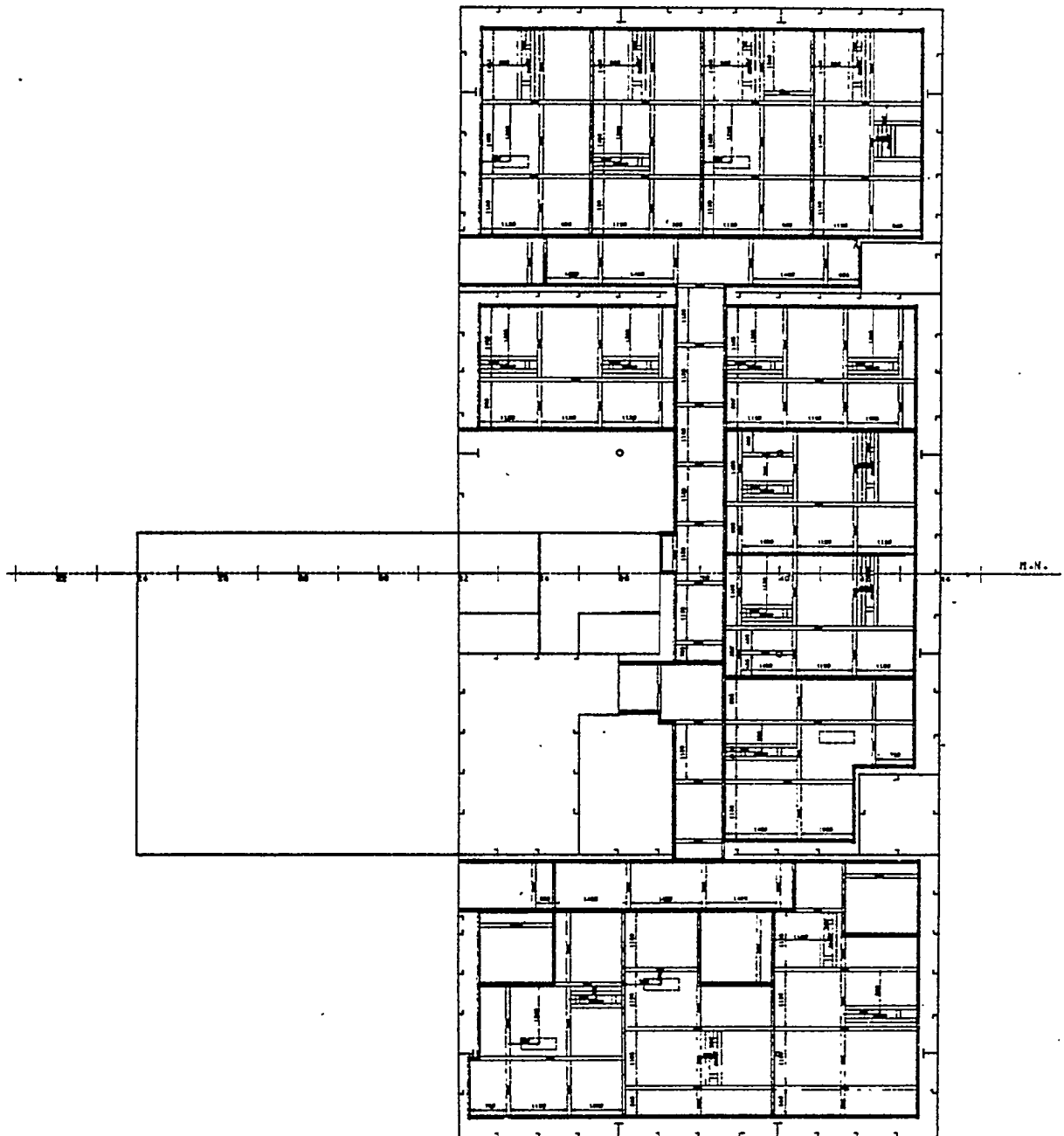
ITALCANTIERI - TEC/ARR				DIG	B372700A1	COSTR. 4363
DATA	MONTE	FIRMA	SCALE	TITOLO		ZONA 76
14 78	CL 40		1:20	SCHEMI TAGLIO PER L'ESECUZIONE DEI PANNELLI PER SOFFITTI		136113 NO. 4

PANNELLI CLASSE N DIG. TI 727340 - TI 727440 ESECUZIONE A
 ANIMA IN PANNELLO AD IMPASTO ESENTE DA AMIANTO SP. 9.5
 LAMINATO PLASTICO FACCIA IN VISTA COLORE (PRO23 TIPO N SP. I NE 214010
 CONTROPLACCATURA LAMINATO FENOLICO TIPO N SP. I NE 216010

CEILINGS PANELS NESTING



ITALCANTIERI TEC/ARR		DISTINTA PANNELLI PER SOFFITTI CEILINGS PANELS LIST				COSTR. 4363		LOTTO N. 2		MODIFICHE			N° FOGLIO	
COMPILATO: DE PAG		STAB. MU		CAP. 0811		DATA 22/11/78		ZONA DIS. 72		JOB ORDER CODE B37270061				1
										INDICE		NOME		DATA
PIECE		MARCA		PEZZI		MARCA		PEZZI		MARCA		PEZZI		
NUMBER		585A		2		123L		2		7001YH		1		025L 7
		/006YB		1		/002YB		1		584H		1		583A 2
		121L		1		/004YB		1		580R		1		576R 4
		576A		7		/005YB		1		582A		2		575R 2
		574B		1		574A		1		569A		1		573A 2
		573H		4		563A		4		562R		1		572A 1
		572B		1		567A		2		561A		1		571A 1
		560A		1		565A		1		552A		1		558R 1
		544A		1		536A		1		170L		1		543A 1
		556A		1		541A		2		548A		2		522A 1
		530A		1		513A		1		512R		1		520R 3
		520A		1		510A		2		508A		1		508R 1
		507A		1		/003YB		1		504A		1		501R 1
		/007YB		1		/008YB		1		/009YB		1		/010YD 1
		/011YB		1		/012YB		1						
														NUMBER



ITALCANTIERI TEC/ARR		DISTINTA PROFILI PER SOFFITTI				COSTR. 63		LOTTO N. A		MODIFICHE			N° FOGLIO 1
COMPIATO: FURLAN		STAB.	MO	CAP. 08	ART. 11	DATA 22/11/78	ZONA 72	DIS. B37270061		INDICE	NOME	DATA	

ELENCO PROFILI PER IMBONAGGI — FURRING. PROFILES LIST			
NI 724550	IMBONAGGIO FINITO PER SOFFITTI TIPO 522	PEZZI 3	LUNGHEZZA 210
NI 724550	IMBONAGGIO FINITO PER SOFFITTI TIPO 526	PEZZI 1	LUNGHEZZA 610
NI 724550	IMBONAGGIO FINITO PER SOFFITTI TIPO 527	PEZZI 8	LUNGHEZZA 710
NI 724550	IMBONAGGIO FINITO PER SOFFITTI TIPO 528	PEZZI 5	LUNGHEZZA 810
NI 724550	IMBONAGGIO FINITO PER SOFFITTI TIPO 529	PEZZI 26	LUNGHEZZA 910
NI 724550	IMBONAGGIO FINITO PER SOFFITTI TIPO 530	PEZZI 2	LUNGHEZZA 1010
NI 724550	IMBONAGGIO FINITO PER SOFFITTI TIPO 531	PEZZI 15	LUNGHEZZA 1110
NI 724550	IMBONAGGIO FINITO PER SOFFITTI TIPO 532	PEZZI 2	LUNGHEZZA 1210
NI 724550	IMBONAGGIO FINITO PER SOFFITTI TIPO 533	PEZZI 2	LUNGHEZZA 1310
NI 724550	IMBONAGGIO FINITO PER SOFFITTI TIPO 534	PEZZI 9	LUNGHEZZA 1410
NI 724550	IMBONAGGIO FINITO PER SOFFITTI TIPO 536	PEZZI 1	LUNGHEZZA 1610
NI 724550	IMBONAGGIO FINITO PER SOFFITTI TIPO 541	PEZZI 1	LUNGHEZZA 2110
NI 724550	IMBONAGGIO FINITO PER SOFFITTI TIPO 546	PEZZI 1	LUNGHEZZA 2610
NI 724550	IMBONAGGIO FINITO PER SOFFITTI TIPO 547	PEZZI 1	LUNGHEZZA 2710
NI 724550	IMBONAGGIO FINITO PER SOFFITTI TIPO 552	PEZZI 1	LUNGHEZZA 3210
NI 724550	IMBONAGGIO FINITO PER SOFFITTI TIPO 554	PEZZI 2	LUNGHEZZA 3410
NI 724550	IMBONAGGIO FINITO PER SOFFITTI TIPO 558	PEZZI 1	LUNGHEZZA 3810
NI 724550	IMBONAGGIO FINITO PER SOFFITTI TIPO 560	PEZZI 1	LUNGHEZZA 4010
NI 724550	IMBONAGGIO FINITO PER SOFFITTI TIPO 566	PEZZI 1	LUNGHEZZA 4610
NI 724550	IMBONAGGIO FINITO PER SOFFITTI TIPO 568	PEZZI 1	LUNGHEZZA 4810
NI 724550	IMBONAGGIO FINITO PER SOFFITTI TIPO 570	PEZZI 2	LUNGHEZZA 5010
NI 724550	IMBONAGGIO FINITO PER SOFFITTI TIPO 572	PEZZI ①	LUNGHEZZA 5210
		QUANTITY	SIZE

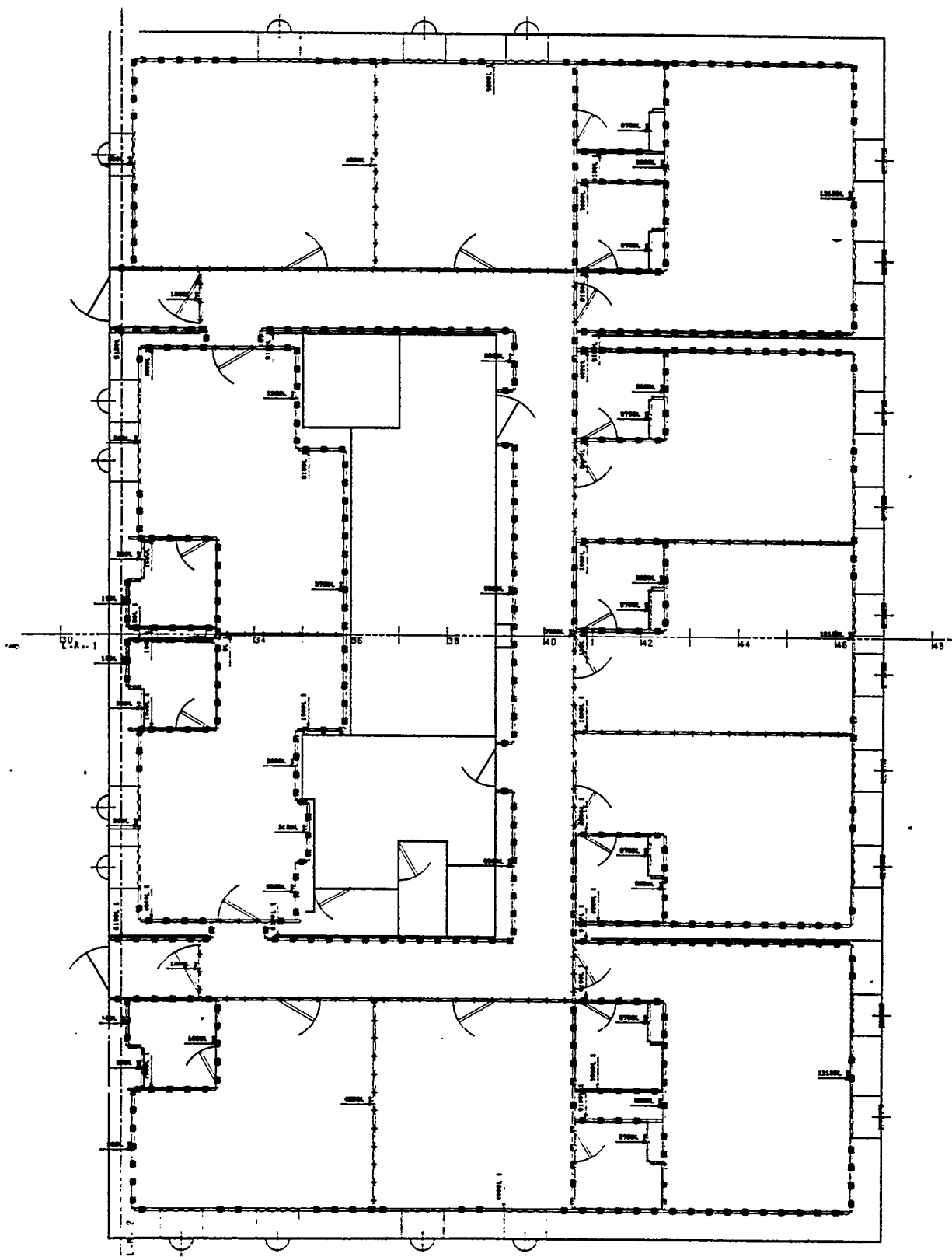
ELENCO PROFILI PER IMBONAGGI — ARCHITRAVI — BULKHEADS UPPER PROFILES LIST			
PROFILO SPECIALE SAGOMATO A FREDDO TIPO 701 LUNGH. 6000 -		PEZZI 5	
PROFILO SPECIALE SAGOMATO A FREDDO TIPO 702 LUNGH. 6000 -		PEZZI 9	
NI 724550 CAVALLETTO TIPO 431 -		PEZZI 174	

Procedure for coamings

On the basis of data regarding bulkheads, the type of room concerned, and height of the utilized floor foundation, the various types of profiles necessary for panels support are identified; after being identified, they are drawn with a symbol which is different for each type of profile.

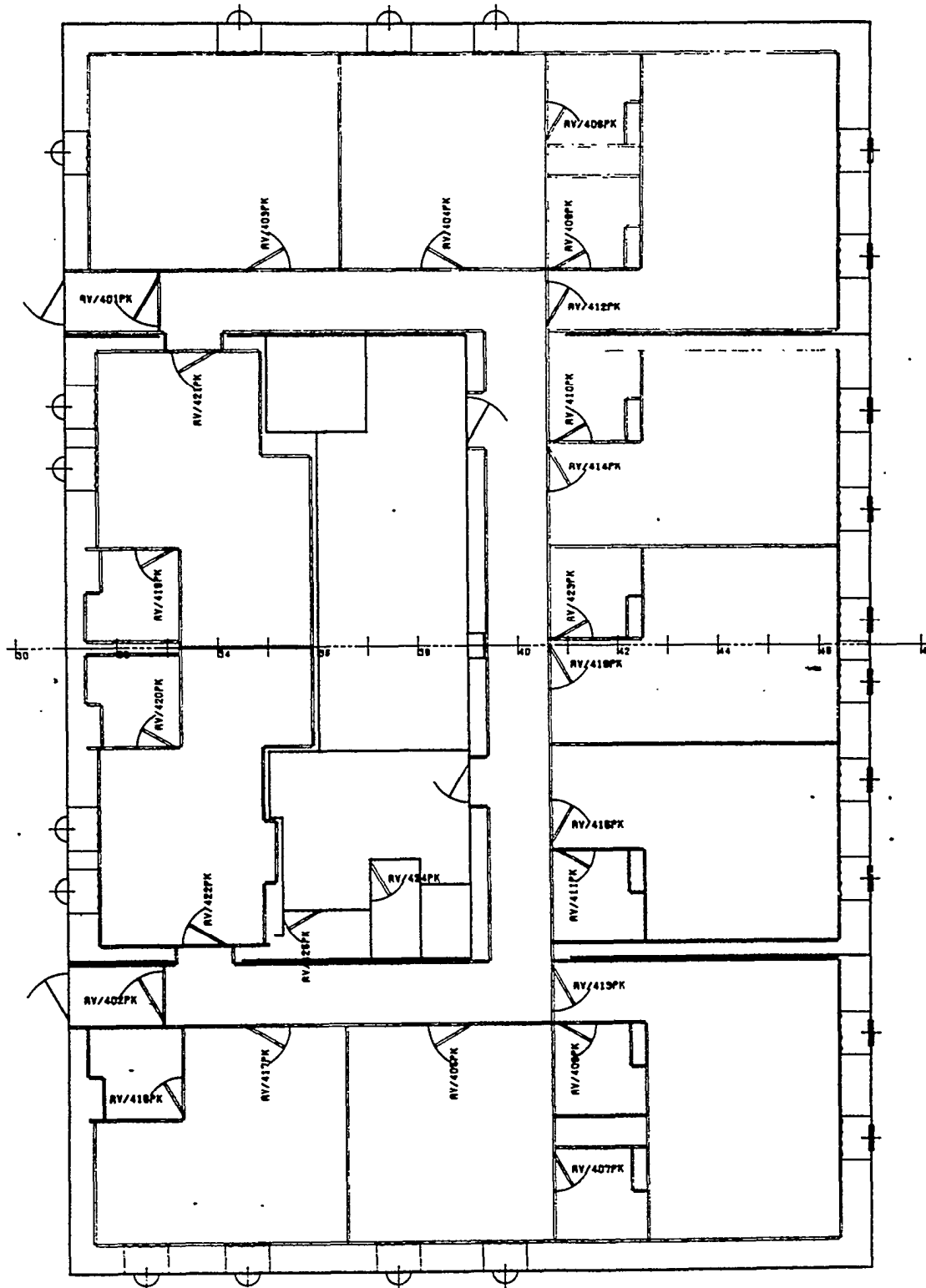
The produced plan reports also the profiles dimensions to the next reference line.

As for the all other outfitting materials also with this procedure all materials lists are automatically produced.



Procedures for doors,
sidelights, and windows

Processing of previously stored data produces dimen-
sioned and marked plans regarding doors, sidelights
and windows and all relevant material lists.



INTERACTIVE DESIGN MODE

In the procedures in which, owing to the fact that the graphic elements to be handled are complex and unforeseeable, it is essential to have the availability of the shapes, dimensions and obstacles for a correct storing. For that a graphic-interactive working mode has been adopted.

As hardware support a TEKTRONIX screen, with refresh buffer, was chosen and connected to the Main Computer. The principal interactive design procedures are those regarding:

- Furniture
- Sanitary fittings
- Ceiling lamps and anemostats

Procedure for furniture

Differently from other procedures where the deck is the working unit, here the work is performed cabin by cabin in order to increase the execution speed by reducing the graphic elements down to the essential.

* Ease of use

In order to help the operator, it was decided to standardize, besides all pieces of furniture which may interest naval furnishing, also all possible furnishing combinations for each type of cabin.

In this way when the operator retrieves the cabin on the screen, all the pieces of furniture which can be there inserted are automatically connected to the cabin's code; they appear one after the other on the screen in the most rational order for the furnishing sequence.

Ease of movements

The graphic elements, which can be connected by a characteristic point at the cross-hair, may be moved on the whole screen and rotated by any angle until they find their most suitable position.

Furnishing for symmetrical or translated cabins

In the case that very often happens in the naval field in which cabins are involved having a perimeter symmetrical or translated with reference to other cabins already furnished, by simple commands it is

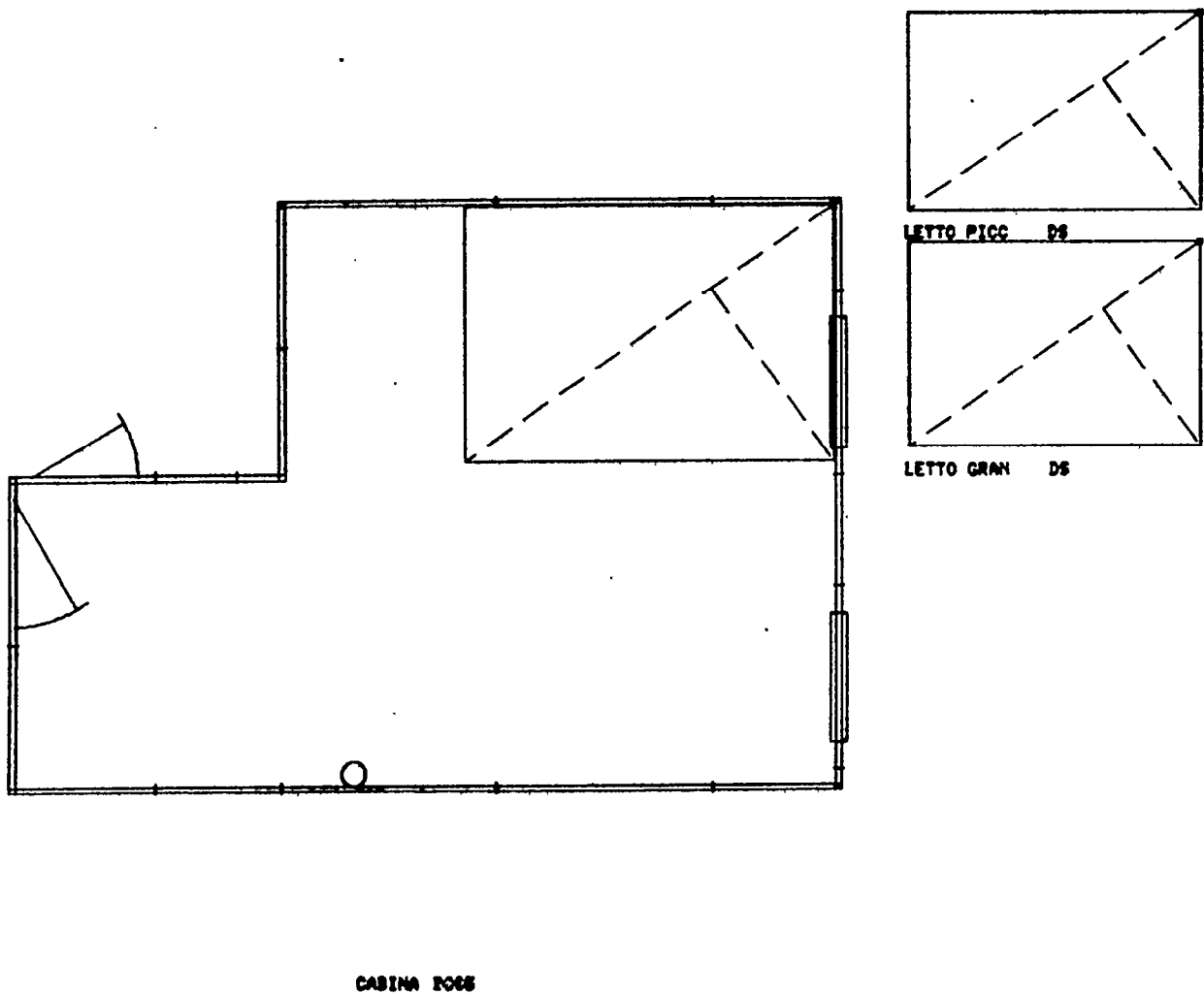
possible to reverse or translate the existing furniture disposition and avoid the tedious repetition of the work; in this way it is possible to furnish the whole ship deck in a very short time.

Design speed

After all cabins are furnished, the system produces, besides the plans in the requested scale, all materials list necessary for construction and assembling of furniture on board.

Procedure for sanitary fittings

By a procedure similar to that already examined for furniture, sanitary fittings with all accessories are also positioned by screen in the sanitary rooms and also here it is possible to obtain very easily all the drawings and the material lists.

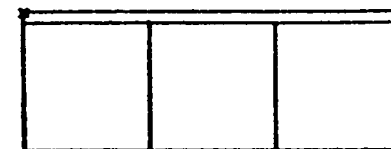
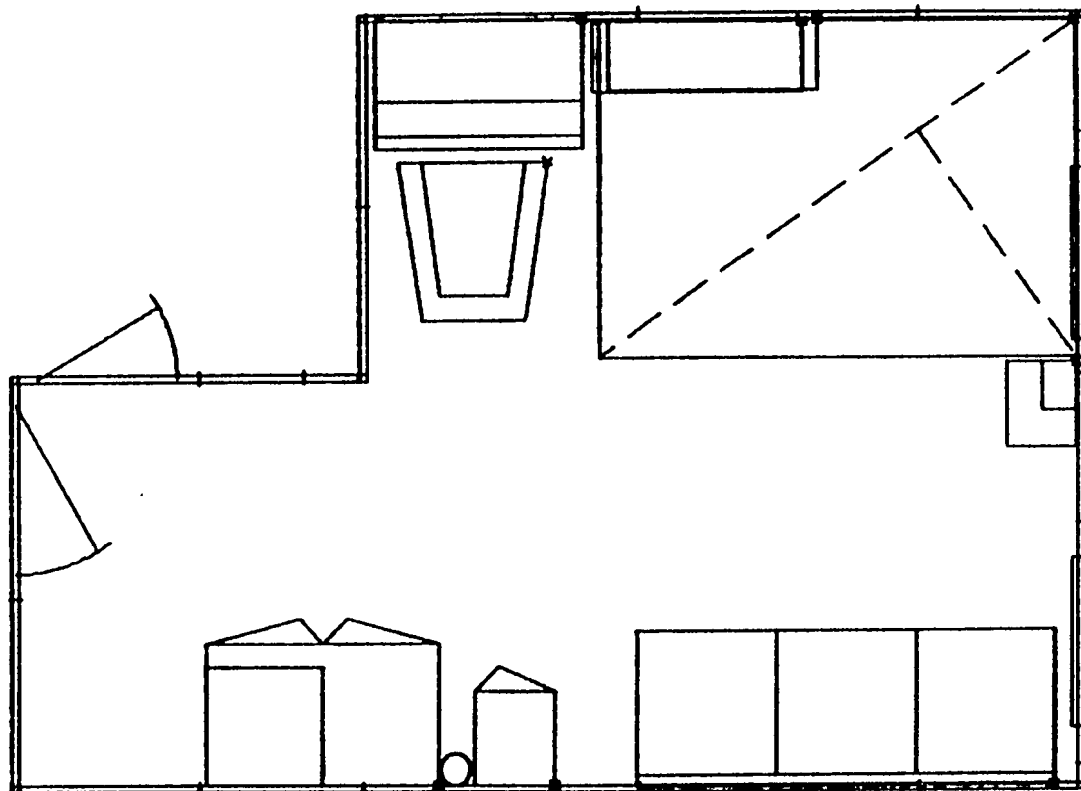


>128.

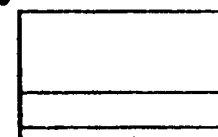
71

18

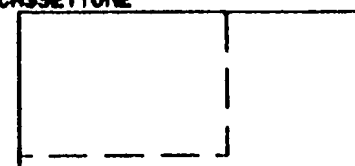
>129.



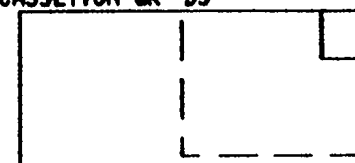
DIVANO



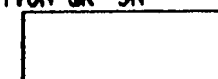
CASSETTONE



CASSETTON GR DS



CASSETTON GR SN

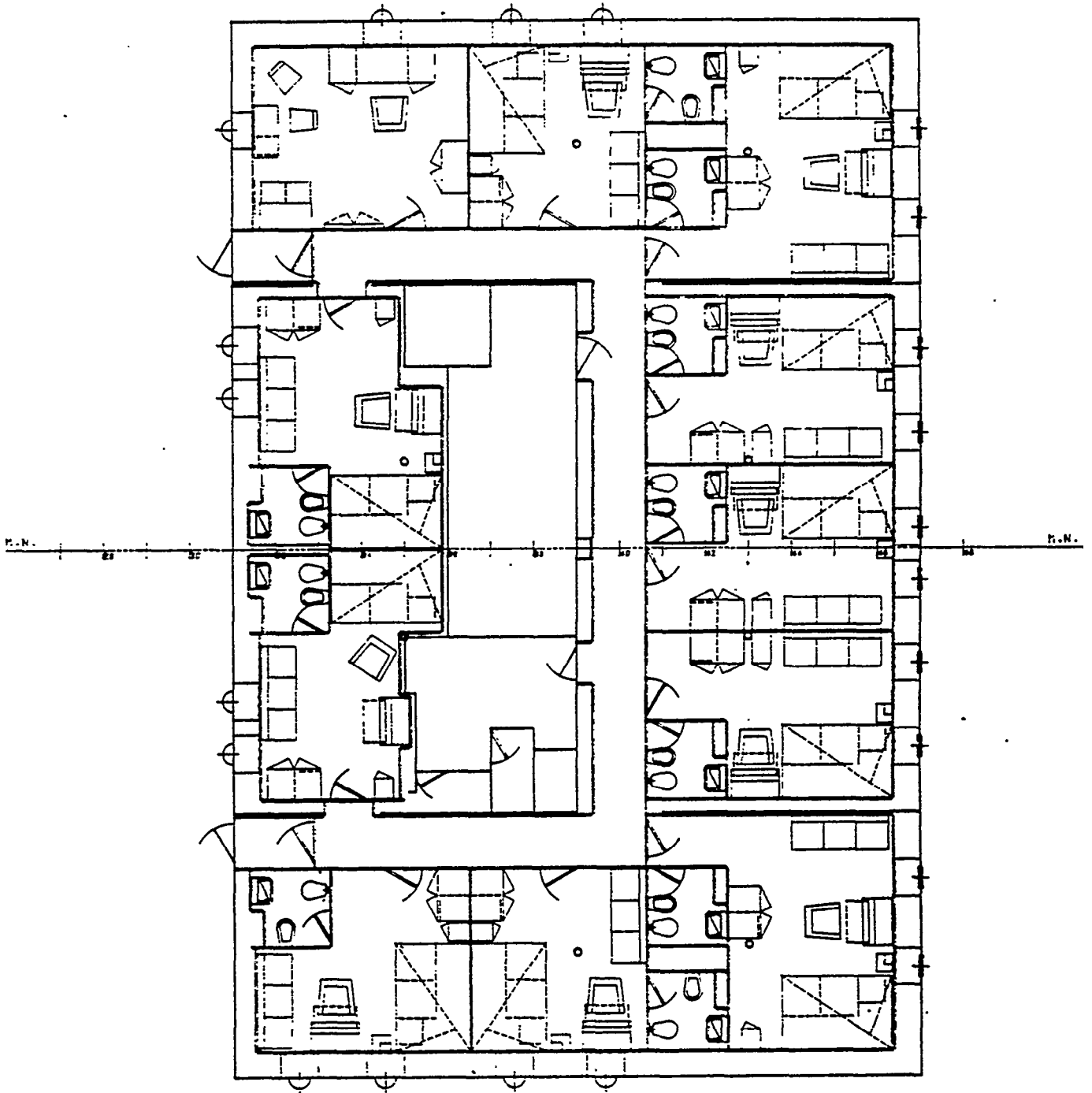


LIBRERIA PEN



POLTRONCINA

CABINA BOOS



FURNITURE LIST OF A ROOM		CONTR		LUTTO N		MOD		DATA	
LISTA MOBILI VANO 0009 DEST. C01C		4343		JOB ORDER CODE		INVOICE		NOMI	
DATA		ZONA		74					
1/2/78		DIS/01		PALLET					
TIPO	COLORE	CONCIE OTS	MARCA	ZZO					
FURNITURE TYPE	COLOUR	MATERIAL CODE	PIECE NUMBER						
L. TIO PICC DS	TANGANICA WALLNUT	7311110000N 00100X	JE7 MILE						
T. SOLO NOTTE SN	TANGANICA WALLNUT	7331180000X 08710A	JE7 M TV						
CASSETTONE	TANGANICA WALLNUT	7337100000N 10750T	JE7 MTR						
A. RADIO GUAR DS	TANGANICA WALLNUT	7321110000S 01130U	JE7 MTR						
STIPETTO DS	TANGANICA WALLNUT	7325110000C 05500B	JE7 MTR						
DIVANO	REX N. 1121 BROWN	7357110000H 06030H	JE7 MTR						
LIBRERIA PEN	TANGANICA WALLNUT	7323110000K 03410B	JE7 MTR						
POLTRONA	REX N. 1121 BROWN	7353100000M 02020G	JE7 MTR						

Layout of ceiling
lamps and anemostats

This work is performed cabin by cabin. After automatic subdivision of ceilings into panels, by very simple commands, by pointing the screen cross-hair on the chosen panel, storing is made of the position and type of lamps and of the position and dimensions of holes for anemostats installation. In order to speed up the process, some standard positions of the holes in the various panels are fixed and, if it is necessary, non standard elements can also be very simply stored.

HARDWARE

Man-computer communication within the CASA system is realized through a TEKTRONIX 4014 terminal connected with the Main Computer; the installation of a refresh buffer allows, for the procedures which require this performance, also a limited activity in the refresh mode.

The configuration is completed by a hard-copy connected to the screen and by an off-line plotter for production of all the drawings utilized for design completion, for workshop manufacturing, and for installation on board of all furnishing materials of the superstructures.

The choice of such hardware turned out to be a very profitable compromise from a technical-economical point of view as it unifies the advantages of low purchase and maintenance costs and the advantages to offer the capability of moving on the screen geometrical figures even not very complex.

MODULARITY OF THR SYSTEM

The C.A.S.A. system has been designed so that it can be modularly inserted in the company's information system.

With this purpose the System organizes and prepares all data so that they can easily be retrieved from the systems connected with CASA. These systems deal with the handling of all furnishing materials from purchase to arrival of components to the yard, to their assembling at the workshop, and to their definitive installation on board.

ADVANTAGES

After being exploited on a considerable number of ships the CASA system has widely proved its validity in furnishing design and in workshop documents preparation.

The most significant advantages are:

- 1 - reduction of technical times for the preparation of the workshop documentation which - (for a prototype ship) - decreased from 12 down to 6 months; this problem is maximally felt when prototype ships with short delivery times are involved;
- 2 - Reduction of technical office work load which is decreased (in the area interested by the system) from 6000 down to 2000 hours;
- 3 - Saving on costs of materials in stock, better utilization and reutilization of materials;
- 4 - Rationalization of -yard's work thanks to a better quality, quantity and quickness of information received.

Further' more utilization of CASA on different types of ships has shown its high flexibility by obtaining excellent results on ferry-boats, tankers, merchant-ship, and off-shore.

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