No. 276
November 1983

ACCOMMODATION DESIGN

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PREFACE TO THE 1983 ENGLISH TRANSLATION

In March, 1983 I traveled through Scandinavia in order to study developments in ship manning practices and effects on design. In Trondheim Prof. Stian Erichsen gave me a copy of the present paper in its original, Norwegian form. It had been prepared by the naval architect Per Klem for a lecture at the Norwegian Institute of Technology in September 1974. Although nearly a decade old, the paper was still considered unique and valuable. I therefore arranged to have it translated into English by Atle Ellefsen under Prof. Erichsen's supervision. I took it upon myself to edit Mr. Ellefsen's work and then asked Mr. Klem to make further editorial revisions and, where appropriate, substantive modifications based on experience gained since the original publication.

I want to acknowledge my appreciation of Mr. Klem's cooperation as well as that of Mr. Ellefsen and Prof. Erichsen.

Please note that this is the second of a three-part series of papers dealing with current trends in Scandinavian ship manning practices and effects on design. The others are:

No. 275 "Main Principles of Superstructure Design," by Siri Schjetlein

No. 277 "The Influence of New Technology on the Onboard Operations of Merchant Ships," Finnish Shipowners Association.

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May 1983

INTRODUCTION

In any design process an objective attitude is important. This is always followed in designing ships when speaking of main parameters. Our basis is then deadweight, speed, draft, freeboard, etc. -- objective parameters treated analytically without any emotional involvement from the designer. Secondary criteria, such as the breadth of the building dock, are usually also formulated in a similar manner.

Designing sub-systems in a ship is a different matter. Designing navigational equipment, mooring equipment, etc., has always been based on the judgment and experience of a limited number of people. Experience is necessary to evaluate a case correctly; but with experience lies certain impressions, prejudices, and conceptions different from person to person. The basis of the designs become casual, and unjustifiably large differences in solutions are found.

Detailed design can be greatly improved if we can apply objective, rather than subjective, methods.

Fortunately, we are in the situation of bringing in new, theoretical tools enabling us to regard the design of ships' sub-systems in the same objective manner as we do in determining the ship's main parameters. Sciences, such as information analysis and systems analysis, have given us tools to apply objective criteria in design.

However, these tools are still not suitable for a practical solution of a single part-task and the example presented here only takes into account intuitive considerations of the objective rules developed on a theoretical basis. Despite this, I shall try to show how this kind of tool may be used in a practical way as well as for theoretical analyses.

THE SUPERSTRUCTURE PROJECT

An example of sub-system design is that of planning a ship's superstructure. Siri Schjetlein architect, Karl Rogne social scientist, and myself, a naval architect and marine engineer, worked on this as a team in part of a larger project reviewing ship systems in general. Twenty shipowners and three shipbuilders participated in the project. The work was divided into four phases:

1. Internal work by the shipowners with matters of policy based on certain formulated questions.
2. Project seminar, where groups of shipowners (divided according to type of ship) discussed principles and worked on a basis for design.
3. Detailed design of the project in the companies, followed by a summing-up seminar where constraints and priorities were discussed.
4. A series of lectures about detailed problems within the superstructure such as galley equipment, the use of colors, vibration, noise, etc.

Within wide ranges of constraints, our seminars followed the pattern illustrated schematically in Figure 1.

In recruiting participants for the seminars weight was given to choosing persons representing the responsibility of the companies' goals (policy), experience in running new ships (sailing personnel), experience from the newbuilding sector, and experience from the personnel sector.

Prior to the seminars, each shipowner was asked to answer a number of questions regarding policy (enclosure 1). Our purpose in this was to derive a prior understanding of objective criteria. (Some of the owners helped us formulate the questions.)

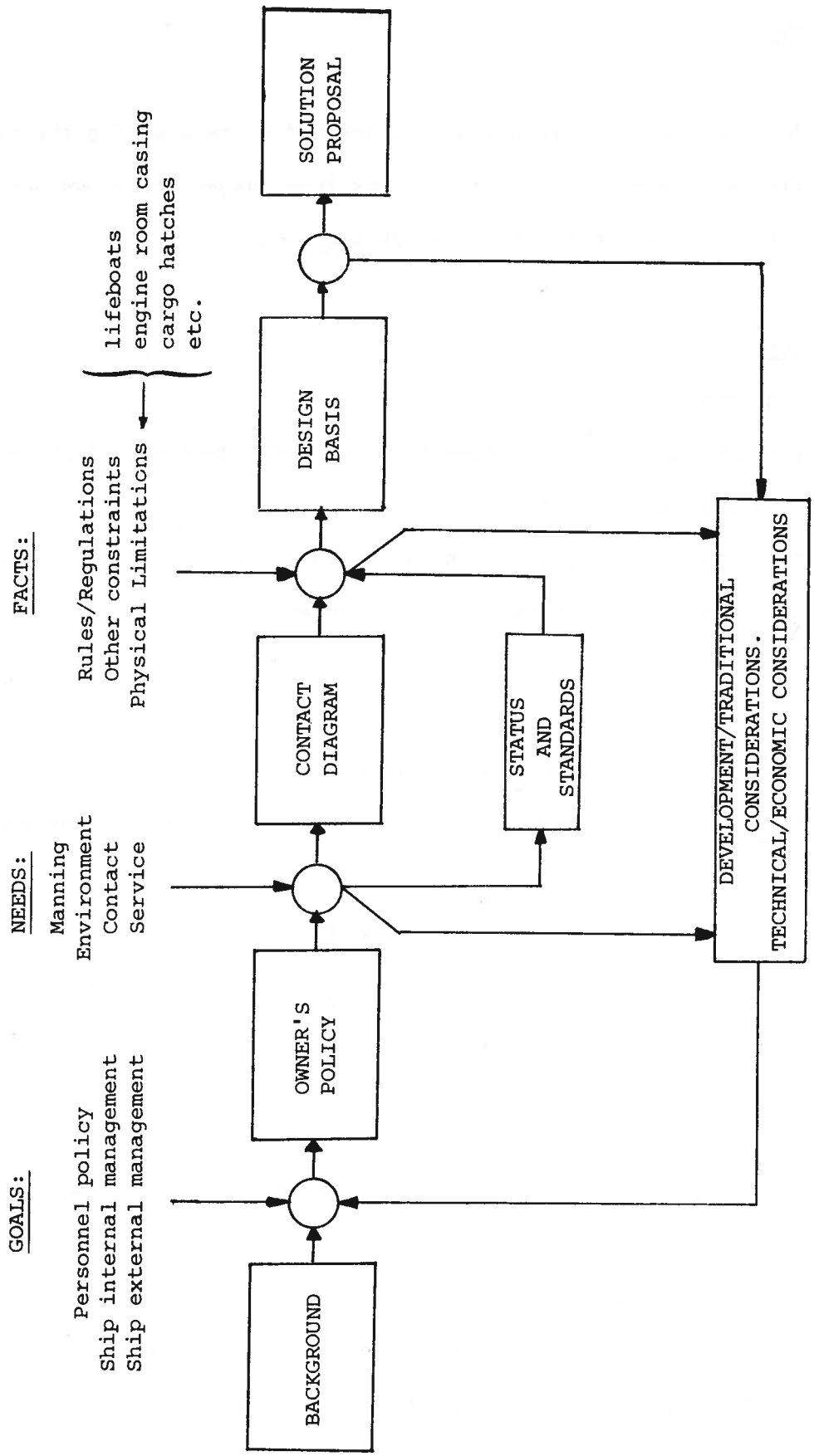


Figure 1. Seminar organization

BASIS OF DESIGN

An objective basis for design may be reached by determining the reason for a decision and by drawing attention away from subjective views and conceptions to study solutions based on principles.

Goals (policy)

These include:

1. Personnel policy, recruiting possibilities, manning pattern and required qualifications.
2. Ship internal management, organization of work, training plans.
3. Ship external management, sailing routes, signing-on time.

Needs

Based on policy, the following requirements must be clarified:

1. Crew number and categories, status hierarchy, cabin standards.
2. Working environment, operation rooms, offices, education.
3. Catering, social environment, internal contact, service.
4. Leisure environment, means of recreation, possibilities of self-education.

Facts

Some given constraints are always present; these usually comprise the following:

1. Laws and regulations.
2. Constraints with a higher priority than the accommodations, and the necessary installations in or near the same.

All of this must be decided with an eye to:

1. Development tendencies derived from tests, perspective analysis, traditions and experience.
2. Economic considerations.
3. Technical/design considerations.

DESIGNING

Decisions about accommodations involve repeated adjustment and compromise, just as in fairing the ship's lines. In order to illustrate this more closely we can go back to Figure 1 and see that we have return loops in the diagram as the work proceeds.

It is extremely important to keep an overall view of our decisions and the consequences of any change.

One of the tools to be used in order to get this overall view is the contact-diagram. This illustrates the organization of the different rooms in relation to each other, the required contact between the rooms, and their functions. By using a contact-diagram one avoids binding oneself to a concrete plan at an early stage, and one has an independent reference when designing the final solution. See Figure 2.

A diagram of this type may also be used as a reference in traffic and transport analyses.

Status levels and standards cannot be expressed by diagrams. In that case lists or forms may be used to illustrate the principles, as shown in Figure 3.

Put together, the contact diagram and abovementioned lists will give a complete, but still general and independent, picture of the accommodation, and one easily subject to objective evaluation.

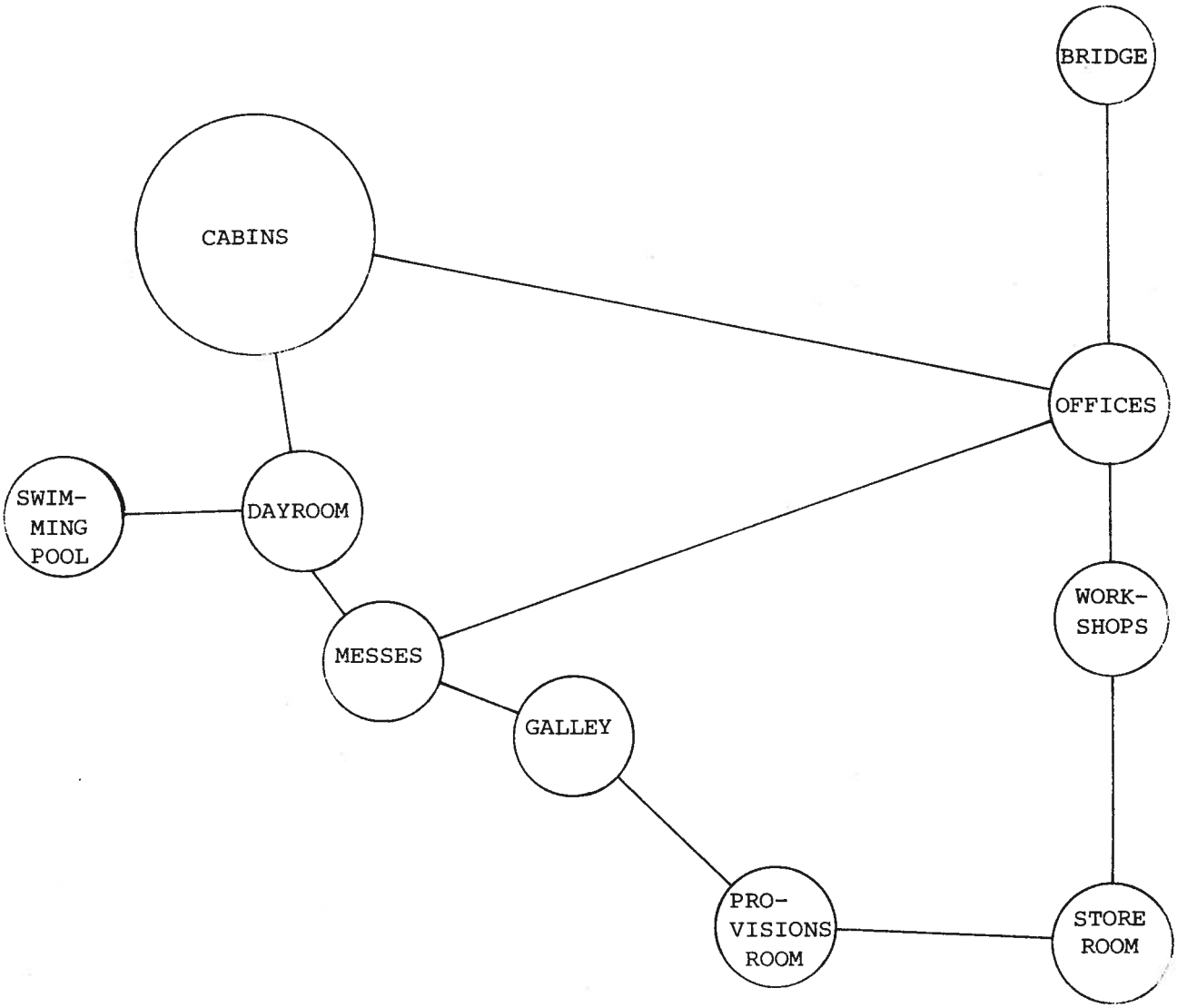


Figure 2. Typical contact diagram

CABINS	number	type	area(m^2)
Crew (rules):			
Captain	1		
chief officer	1		
second officer	1		
third officer	1		
radio officer	1		
bo's'n	1		
deck crew	6		
chief engineer	1		
first engineer	1		
second engineer	1		
electrician	1		
repairman	1		
engine crew	4		
steward	1		
cook	1		
service crew	3		
pump-man	1		
Total crew (rules)	27		
20% additional cabin space:			
pilot	1		
traveling repairmen	4		
inspector/owner	1		
Other extra cabins:			
storekeeper	1		
laundry personnel	1		
Total:	35		

Figure 3. Status levels and standards

In developing a contact diagram we are directly or indirectly confronted with the policy established as a basis for the organization and environment. During this we may need to review the policy and perhaps re-evaluate our design. This is indicated by the return-loop shown in Figure 1.

When the time comes to adapt the contact diagram and the required living areas to a given ship-project, we are confronted with the following technical, economic and environmental considerations that are a natural part of the ship as a whole, but involve the accommodation through direct constraints:

1. Casings and other parts of the engine room require space in the superstructure.
2. Engine room ventilation, where air intakes and outlets, fans and ducts may be voluminous or noisy, etc.
3. Cargo and loadline conventions' rules for hatches, door coaming heights, etc., in superstructures, internal entrances, and ladders to the engine room.
4. The steel structure of the ship in general, or the superstructure foundation which is important in reducing vibrations.
5. Profile, being a factor determining the ship's outfitting numeral. This may affect economics.
6. Ladders, shafts and elevator connections to the engine-room, work-shops and stores exterior to the superstructure.
7. Transport routes, hatches and cranes for spare parts, engine parts, and stores.
8. Arrangement of mooring equipment, winches, bollards and similar gear.
9. Ventilation and air conditioning plants for the superstructure.
10. Height of the bridge above the main deck.
11. Antenna arrangement, placing of masts, funnel etc.

Once again, it is necessary here to reconsider one's decisions and check on what consequences any changes may have on the contact diagram, on areas and on the desired standards.

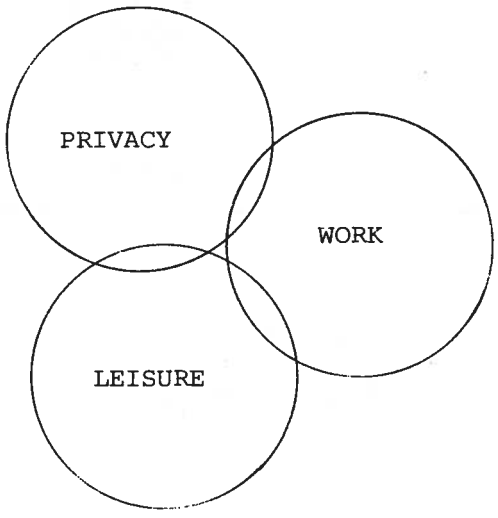
After running through the process a certain number of times, a final basis or program for the design of the accommodation will be achieved.

Even though attention is given to accommodation design, we see that this alone cannot be regarded as an isolated process. On the contrary, it is important to consider accommodation design in relation to the rest of the design work done on the ship. The accommodation design should, indeed, enter the project at an early stage. For example, the situation could arise that a standard cabin design would determine the frame spacing and web location in the aft body, and that the longitudinal girders could be spaced to the ideal beam of a superstructure!

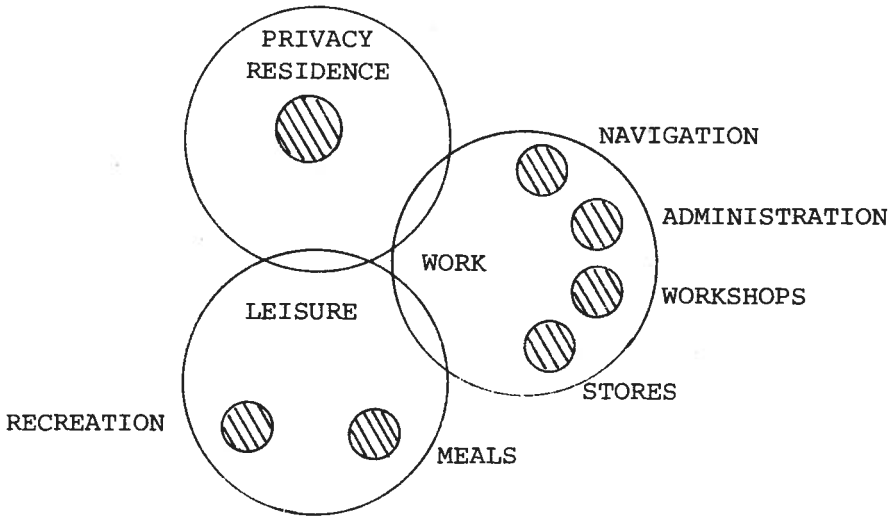
THE CONTACT DIAGRAM

The contact diagram (as in Figure 2) may be built up in several ways, but it should clearly lead to a solution based on the previously enunciated principles, with clear alternatives for possible future changes in priorities.

Let us consider the three main zones on board: LEISURE, WORK, and PRIVACY.

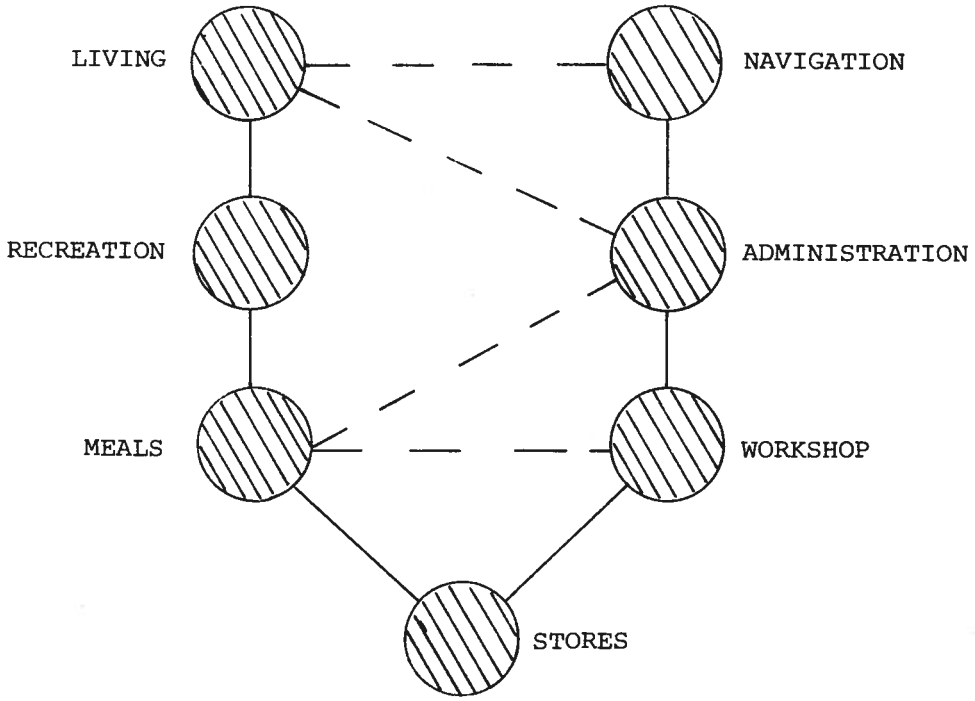


Within these zones the following seven function-centers are desired: RECREATION, MEALS, RESIDENCE, ADMINISTRATION, NAVIGATION, WORKSHOPS, and STORES.

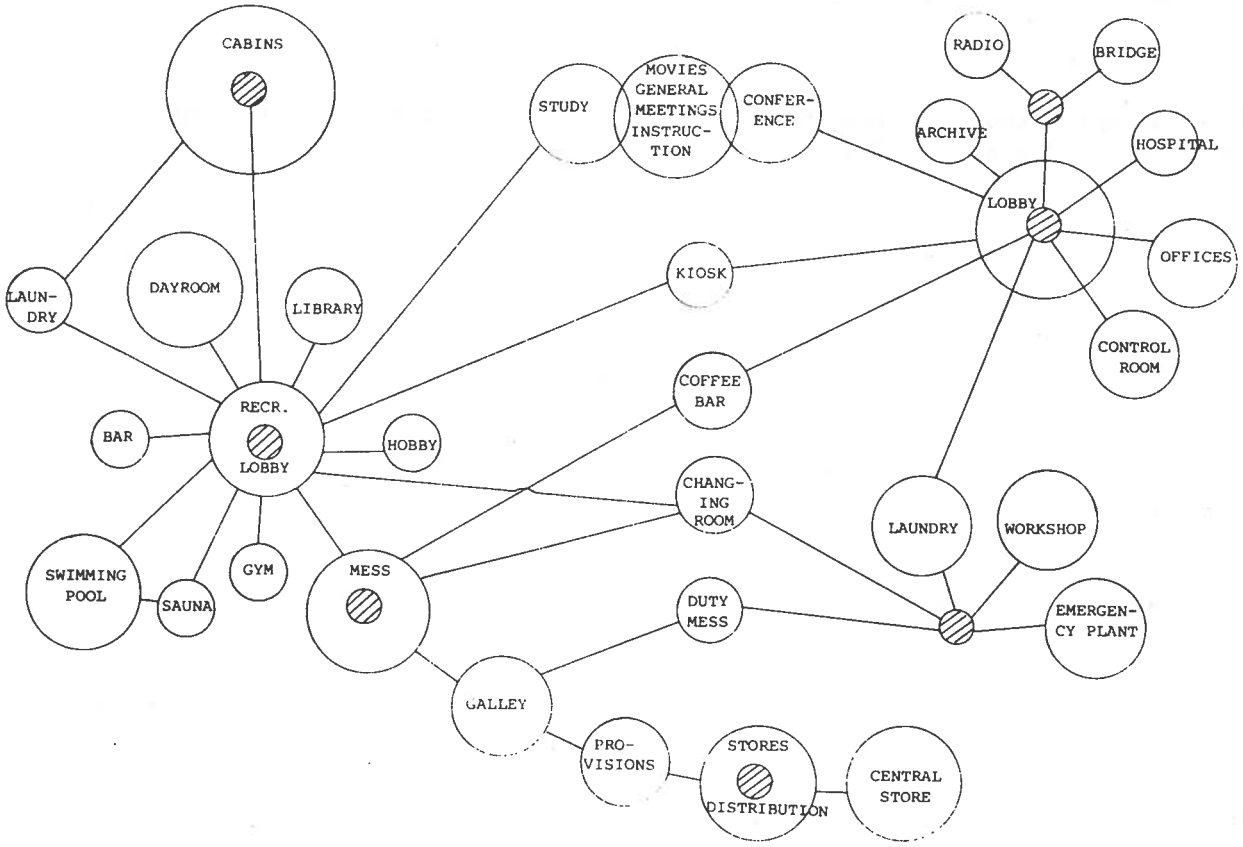


We have here chosen to place the meal-function into the leisure zone.

Furthermore, we wish to show both a first priority and secondary connections between these function-centers:



If we next designate the different kinds of rooms, these will all have primary connections to one of these centers, and some will have secondary connections to other centers. Later on it might be necessary to reconsider these connections dependent on available deck areas, elevator connections, etc.



Finally, it is important to realize that when this schematic work has been used as a basis for the planning and design of the superstructure, the final result, even though the basis is correct, may be either good and bad. However, I believe that a bad solution of the correct problem is better than a good solution of the wrong problem.

RECRUITING — Enclosure 1-1

Card 1 — Shipowner:

A. Does the company prefer Norwegian crew on this type of ship?

B. The most important offers that, according to the owners, will attract and keep Norwegian personnel:

C. Tasks onboard that, according to the owners, will have a stimulating and challenging effect on future crews.

RECRUITING

Card 2 — Shipowner:

A. What are the owner's suggestions as to organizing for carrying out trivial tasks on board?

B. What persons will possibly be occupied with such tasks only?

RECRUITING

Card 3 — Shipowner:

A. Is the future goal that of reducing the difference between living conditions on ship and land, and retaining normal sailing periods (1-6 months), or

B. Is the goal to reduce sailing periods so that one virtually works-sleeps-eats onboard and has frequent holidays?

To which if these goals will the owners primarily strive?

What length and spacing of sailing periods and holidays are expected?

Are people requested to return to the same ship after holidays?

OPERATION

Card 4 Shipowner:

A. Does the owner go in for "decentralized/partly self-managed" ships?

B. Eventual difficulties concerning such an operating policy.

C. What functions should be common for the entire ship?

D. What combination of positions may be considered?

E. What other positions should be given additional competence?

OPERATION

Card 5 Shipowner:

A. Should each crew member be able to influence his/her own labor situation (work-plan)?

B. What can be done to obtain this condition if so desired?

C. Who should participate in work-planning?

Short-term plan meetings:

Long-term plan meetings:

General, public meetings:

Other meetings:

SUMMING UP

Card 6 Shipowner:

Based on the answers given on cards 1-5, the owners mean that the development trends toward:

A. Greater/less differences in competence levels among the crew as a whole.

B. More/less cooperation across status borders within the crew.

C. Broader/narrower social integration in leisure time.

D. Greater/less social equality.

What does this imply in the design of the accommodation?

CONTACT AREAS

Card 7 Shipowner:

A. What areas should be separated in the accommodation?

B. If a central office-area is chosen, where should it be located?

C. Should the galley/mess area be located on the same deck as the provisions room or on the same deck as the dayroom?

D. Should all the cabins be situated in one area? And should the cabins be arranged on different decks according to status?

CONTACT AREAS

Card 8 Shipowner:

A. Where should the change room be situated and why?

B. In what places on board could it be desirable to have a lobby?

C. Where should a work-planning-board/notice board be placed?

CONTACT AREAS

Card 9 Shipowner:

A. What kind of training/education is most relevant on board?

B. Would self-education on board be influenced by a stimulating environment?

C. How should fiction/specialized literature be kept on board?

CONTACT AREAS

Card 10 Shipowner:

What kind of mess-arrangement will be chosen?

A. Separate messes for officers and crew.

B. One mess with the possibility of subdivision by a folding wall.

C. One common mess supplemented with a small duty mess for crew in work clothes and/or outside ordinary mealtimes.

What rules/efforts would be necessary for a common mess to function well? How many seats are required in a duty/night mess?

AREAS

Card 12 Shipowner:

Areas in Superstructure

Rooms in Work Area			Public Rooms, Service Rooms		
Room	No.	m^2	Room	No.	m^2
Office Lobby			Hospital		
Room for Business Entertainment			First Aid Room		
Room for Conferences			Kiosk and Store		
" " Instruction			Main Mess		
Captain's Office			Duty Mess		
Chief Eng's Office			Coffee Bar-Lobby		
Chief Off's Office			Galley and Pantry		
Steward's Office			Laundry for Ship's Laundry		
Control Room			Ironing Room		
Change Room, Guests			Linen		
Workshops, etc.			Room for Cleaning Equipment		
			Other:		

AREAS

Card 12 A. Shipowner:

Areas in Superstructure

Rooms Connected to Bridge			Rooms Connect to Cabins		
Room	No.	m^2	Room	No.	m^2
Wheelhouse	1		Bucket Closet		
Transformer Room			Luggage Room		
Radio Room			Fan Room, Air Cond.		
Battery Room			Changing Room, Crew		
Sea Cabin			Fuse box		
			Telephone Switchboard		
			Stairway Casings		
			Laundry, Clothing		
Others:			Others:		

AREAS

Card 12 C Shipowner:

Rooms in Superstructure

Recreation Rooms

Room	No.	m^2	Room	No.	m^2
Lobby, Entertainment					
Day Room, (Noisy)					
Day Room, (Quiet)					
Swimming Pool					
Gym	1 or 2 decks				
Sauna-Shower-Restroom					
Dark Room					
Movie Projector Room					
Library					
Hobby Room					
(Movie Theater)					
(Reading Room)					

AREAS

Card 12 D Shipowner:

Rooms in Superstructure

Rooms for Emergency Equipment			Store Rooms		
Room	No.	m^2	Room	No.	m^2
Foam Room			Lamp Room		
CO_2 Room (Tank/Flasks)			Oxygen/Acetlyene Room	2	
Emergency Generator			Handling Room		
Emergency Fire Pump			Deck Store		
Emergency Station			Paint Store		
Others:			Chemicals		
			Beer, Minerals		
			Liquor		
			Dry Provisions		
			Meat		
			Fish		
			Vegetables		
			Dairy Products		
			Potatoes		
			Hotel Stores		
			Deck Chairs		
			Gym Equipment		