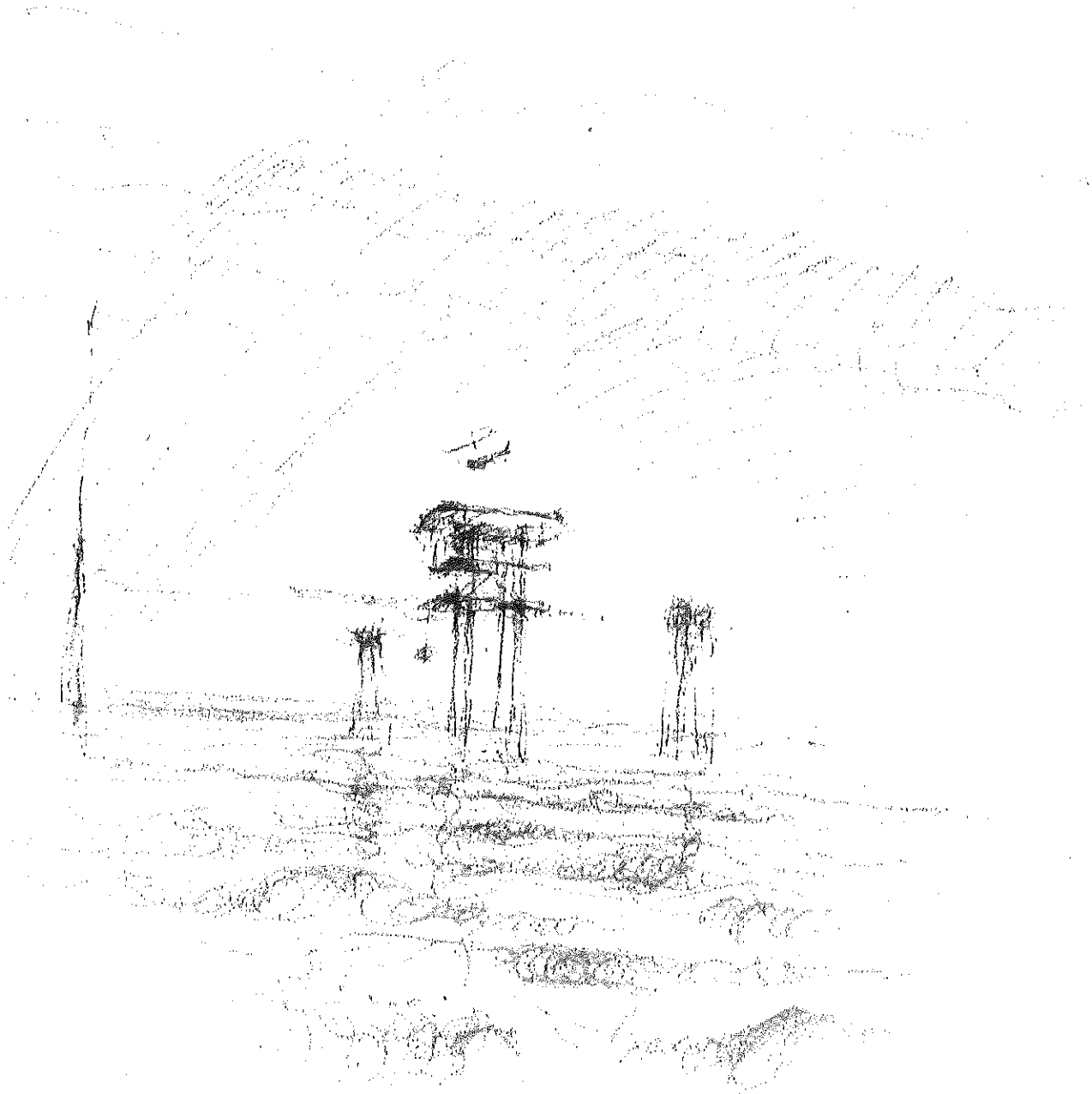
LIVING QUARTERS
DAN FIELD "B"



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NTERNATIONAL STEEL CONSULTING LTD.
RE FARIMAGSGADE . DK-1364 COPENHAGEN K . DENMARK . PHONE (01) 14 62 20 . REG. NO. DK 39028

LIVING QUARTERS

DAN FIELD "B"

PRELIMINARY DESIGN AND PRICE ESTIMATE

OCKTOBER 1975

CONTENT

1. Scope

The preliminary design and price estimate includes turn key Living Quarters on production platform of Dan Field B for a normal working force six with possibility of further 6 people overnighting occasionally.

The living quarter is proposed situated on the main deck besides and over the prover loop.

Available space for onsite assembly and mounting is extremely limited.

The construction system and erection principle is therefore designed for as high a degree of onshore prefabrication as possible in order to minimise the amount of mounting and installation work on the platform.

2. Content of Drawings

K1 - 1 CONTENT OF DRAWINGS

K2 - 1 PLAN, MAIN DECK

K2 - 2 PLAN, 1st FLOOR

K2 - 3 PLAN, 2nd FLOOR

K2 - 4 PLAN, 3rd FLOOR

K3 - 1 ELEVATION

K3 - 2 ELEVATION

K3 - 3 ELEVATION

K4 - 1 ERECTION STAGE 1

K4 - 2 ERECTION STAGE 2

K4 - 3 ERECTION STAGE 3

K4 - 4 ERECTION STAGE 4

K4 - 5 ERECTION STAGE 5

J1 - 1 1st FLOOR HEATING AND VENTILATING

J1 - 2 2nd FLOOR HEATING AND VENTILATING

J1 - 3 3rd FLOOR HEATING AND VENTILATING

3. Design Data

The design is based on "Specification For Living Quarters at Dan Field B preliminary Design" from Dansk Boreselskab A/S of 29. Aug. 1975.

Information about the excisting platform structure has been obtained from Brown and Roote drawings.

4. Lay-out Plan and Function

4.1 First floor

The first floor contains combined kitchen and rest-room for 6 persons.

The kitchen facilities consists of the following items:

1. Kitchen cupboards with kitchen table
2. Kitchen sink
3. Oven and stove with four electric heated cooking plates.
4. Hood with greasefilter for removal of steam from cooking.
5. Refrigerator, 422 l.
6. Deepfreezer, 344 l.

The room is provided with a fixed dining table and bench arrangement.

Access to the room from the main deck takes place through on air lock to elimimate draught and to diminisk risk of gas flow through the doorway.
The area distribution is as follows:

Air lock	1,0 m^2
Kitchen	12,3 m^2
Total area	13,3 m^2

4.2 Second floor

The second floor contains washroom and stairway to third floor.

To eliminate draught and to diminish gas flow through doorway, access to the outside stair to main deck takes place through an air lock.

The space beneath the stair to the third floor is utilized for installation of hotwater tank.

The washroom contains the following facilities:

1. Two toilets
2. Two wash basins
3. One shower
4. Washingmachine and tumbler drier.

The sanitary installation meets the demands of the labour Inspection Board for a ten-man working force.

A possible second shower as called for in the design data mentioned in part 3 would enable the washroom to serve twenty persons according the labour Inspection board standard. The available space however hardly permits a second shower unless the proprosed air lock is abandoned.

The area distribution on the second floor is as follows:

Washroom	8,4 m^2
Air lock	1,2 m^2
Stair	3,7 m^2
Total area	13,3 m^2

4.3 Third floor

The third floor contains stairway to the second floor corridor and three cabins.

Each cabin is provided with two beds and three floor to ceiling cupboards.

The cabin area is sufficient to allow the instalment of two extra beds in each room.

The normal access way to the main deck passes through the washroom on the second floor.
The area distribution is as follows:

Stair	4,1 m^2
Corridor	12,0 m^2
Cabin	9,3 m^2
Cabin	9,3 m^2
Cabin	9,3 m^2
Total area	44,0 m^2

5. Safety Precautions, Rescue Capsule etc.

The design of emergency escape exits, balconies and ladders is based on a possible rescue capsule situated in level with the main deck adjacent to the end wall at the kitchen section.

5.1 Resue Capsule

The proposed rescue system is a 28-man survival capsule manufactured by the Whittaker Corporation,USA.

The system comprises a Capsule type CA 28 with hoist type W 28.

5.2 Emergency Escape Exits

The Rescue Capsule can be reached from the normal building exits or by the following alternative emergency exits:

Emergency exit from the kitchen om first floor takes place by window directly to the platform around the rescue capsule.

Emergency exit from the washroom on second floor takes place through the window to the outside ladder leading down to platform around the Rescue Capsule.

Emergency exit from cabins on third floor takes place either through windows in each cabin or through emergency exit door in the corridor to outside balcony with ladder connection to platform around the Rescue Capsule.

6. Structural Systems

The structural systems will appear from the following drawings. K2-1, K2-2, K2-3, K2-4, K3-1, K3-2 and K3-3

The living quarter consists of following structural main items: Modular Box units, external Steel frame system, cantilever structure for trolley support, cantilever structure for hoisting equipment for Survival capsule and platform entrance to survival capsule.

6.1 Modular Box Units

The living quarter volume is build up of modular box units of transportable size to meet the demands of easy erection and short installation time on the platform.

The external walls are sandwich panels in steel with intermidiate layer of heat insulation and sound reducing board.

The heat transmission factor is approximately 0,4 kcal/h C^{o} m^{2}. The average sound reduction through the structure is approximalety 45 dB.

Doors to the outside are class A-60 steel doors. Inside doors are class B1 steel doors.

The stability of the box units is obtained by means of rigid connection of the edge steel members to the external wall diaphragms.

Lifting devices are attached to the upper corners of the individual box units.

The box units are at the edges supplied with simple bolt locks for individual connection and for connection to the external steel frame system.

6.2 Steel Frame System

The steel frame system consists of two interconnected plane frames built of channel sections and RHS sections. Column and beam positions fit with the

joint lines of the box units and with the upper and lower edges of the module lines of same. The column position fits with the main floor beams in the existing deck.

The steel structure is designed with bolted joints throughout, which means that it is built up of straight members only of moderate weight. It thereby meets the demands for easy transport and lifting to the platform deck level by existing hoist devices.

The top beams in each side support the Trolley with attached hoist devices serving as lifting and transport system for the box units.

6.3 Cantilever Structures

The provisional cantilever structure is connected to the steel frame system outside the deck edge to allow for free lifting of the box units from ship to deck level.

The trolley can be dismantled after the installation of the living quarters.

The contilever structure will be dismantled and changed to a lower level cantilever to support the hoist devices for the survival capsule.

6.4 Platform Entrance to Survival Capsule

A platform is arranged cantilevered from the deck in front of the living quarters and serves as bed for the survival capsule. The platform consists of grids supported on elongated secondary beams in the deck.

6.5 Additional load on Main Deck Structure

The $\overset{\max.}{\gamma}$ additional vertical load on the main deck girders is approximalety 36 kN.

The additional horizontal force due to wind on the

facade is approximalety 40 kN at the main deck plane and approximalety 30 kN delivered through vertical guide brackets in plane with the helicopter deck girders.

7. Technical Installations

The living quarter is provided with complete heating-, ventilation-, electrical-, and fire protection systems as shown on the drawings J1-1, J1-2 and J1-3 and as described in the following:

7.1 Heating system

Each room is heated with thermostatic controlled electrical radiators. All radiators are splash proof.

7.2 Ventilation

The ventilation system is designed to ensure an adeguate change of room air and to maintain sufficient surplus pressure in the rooms to prevent gas from leaking into the building.

The air supply unit is mounted vertically above the stairs between second and third floor.

The unit contains automatic damper in the air inlet, filter, electrical multistage heating coil and "no-spark" supply air fan.

The supply air temparature normally 20°C is controlled by thermostat. The unit is fitted with gas detector for automatic shut down of fan and closing of damper in case of gas concentrations of the air inlet and with thermostat for high temparature shut down.

Air intake is placed in position where gas concentrations are presumed least likely.

Pressure in the building is maintained by automatic damper action in the main outlet and by securing an adeguate pressure drop asross the outlet valves in each room.

7.3 Sanitary Installation

Fresh water supply is obtained from excisting water-

tank on the main deck.

Pump and pressure tank for maintaining sufficient waterpressure is placed outside on the main deck adjacent to the supply tank.

Hot water is prepared in electrical heated hot-watertank placed under stairs on the second floor.

Wasbasins, sink, and shower are supplied with mixingvalves (faucets) for hot and cold water.

Waste water from waterclosets, sinks, washing-machine etc. drains to the sea. The outlet of the waste water pipe is submerged approximalety 3 m below the lowwater level.

7.4 Electrical Installation

Power supply is obtained from circuitbreakers in excisting generatorroom.

The electrical installation is installed in accordance with regulations for installations in areas with explosion hazards.

Splash proof switchbox is situated in kitchen/rest-room on the first floor.

Lighting is installed in each room in accordance with Danish standard DS 700.

All lamps, fixtures etc. are splash proof. Cables are mounted on walls and ceilings as visible cable installation.

Emergency lighting is provided to secure evacuation routes sufficient light in case of breakdown or shutdown of normal lighting.

7.5 Fireprotection System

Fireprotection is obtained by a Halon 1301 total flooding system.

The system is designed in accordance with NFPA standard No. 12 A and to meet demands of the Danish Board of Tariffs.

The system is provided with smokeindicators for automatic agent release. The system comprises separate groups for first floor, second floor, stair and corridor on third floor and for each cabin.

Necessary alarm system is installed and connected to existing alarm system in controlroom.

Actuating of agent release automatically shuts down ventilation and the power supply for the floor in question.

Panel for storage containers, control unit, actuating valves etc. is placed at the end of the corridor on third floor.

Gasdetectors are installed on each floor and connected to alarm system.

7.8 Alteration of Existing Installations

Jet fuel tank is moved to new position as shown on the drawings.

Existing sprinkler installation over prover loop is altered to suit the new conditions.

8. Erection Procedure

The erection procedure appears partly from the drawings: K4-1, K4-2, K4-3, K4-4 and K4-5.

As earlier mentioned the steel frame system and trolley are delivered unassembled as straight members and hoisted to deck level by means of existing hoisting devices. An erection joints between the members will be bolted.

The living quarters are delivered as box units and hoisted into position in the shown sequence. The connection between the box units and between the box units and the steel frame are bolted joints.

The gangways and ladders in adequete sized elements are then hoisted and connected to the steel frame.

The cantilever will thereafter be dismantled and changed to the system shown on K4-5 in order to make it adequate for the support of hoisting devices for the survival capsule.

The platform will be hoisted to the deck level by means of the installed hoist devices and erected from the deck using the hoist for preliminary support for the structural elements.

Finally the survival capsule is hoisted to deck level and embedded in the platform.

9. Price Estimate

The following estimate is based on price index of 1. okt. 1975.

Purchase tax is not included in the estimate Shipping from Esbjerg to the platform is presumed carried out by Maersk supply ship and shipping costs are therefore not included in the price estimate.

Transport of personel from Esbjerg and food and lodgins on the platform is likewise not included.
The estimate is specified as follows:

9.1 Construction and Mounting of units

1. Steel structure, platform, catwalks, etc.	d.kr.	100.000,-
2. Temporary hoist	d.kr.	35.000,-
3. Box units complete with heating, ventilation, lighting, sanitary installations etc.	d.kr.	450.000,-
4. Off shore mounting and assembly of steel structure and units	d.kr.	75.000,-
	d.kr.	660.000,-

9.2 Supplementary Installations

1. Power supply, water supply, waste water drain	d.kr.	25.000,-
2. Moving of jet fuel tank, altering of eksisting sprinkler installation	d.kr.	15.000,-
	d.kr.	40.000,-

9.3 Halon Fire Protection System and Gas Detection Installation

	d.kr.	55.000,-

9.4 Rescue Capsule

1. 28-man ~~resure~~ cue capsul	d.kr.	220.000,-
2. Hoist equipment	d.kr.	90.000,-
3. Mounting on platform	d.kr.	10.000,-
	d.kr.	320.000,-

9.5 Associated Costs

1. Detail design, procuring of offers etc.	d.kr.	80.000,-
2. Supervision of construction	d.kr.	30.000,-
3. Printing costs etc.	d.kr.	10.000,-
	d.kr.	120.000,-

9.6 Reserve For unforseeable Costs

	d.kr.	55.000,-
Total price estimate	d.kr.	1.250.000,-

9.7 Alternative prices

Alternative installation of 14-man rescue capsule reduces the price by approximalety

d.kr. 125.000,-

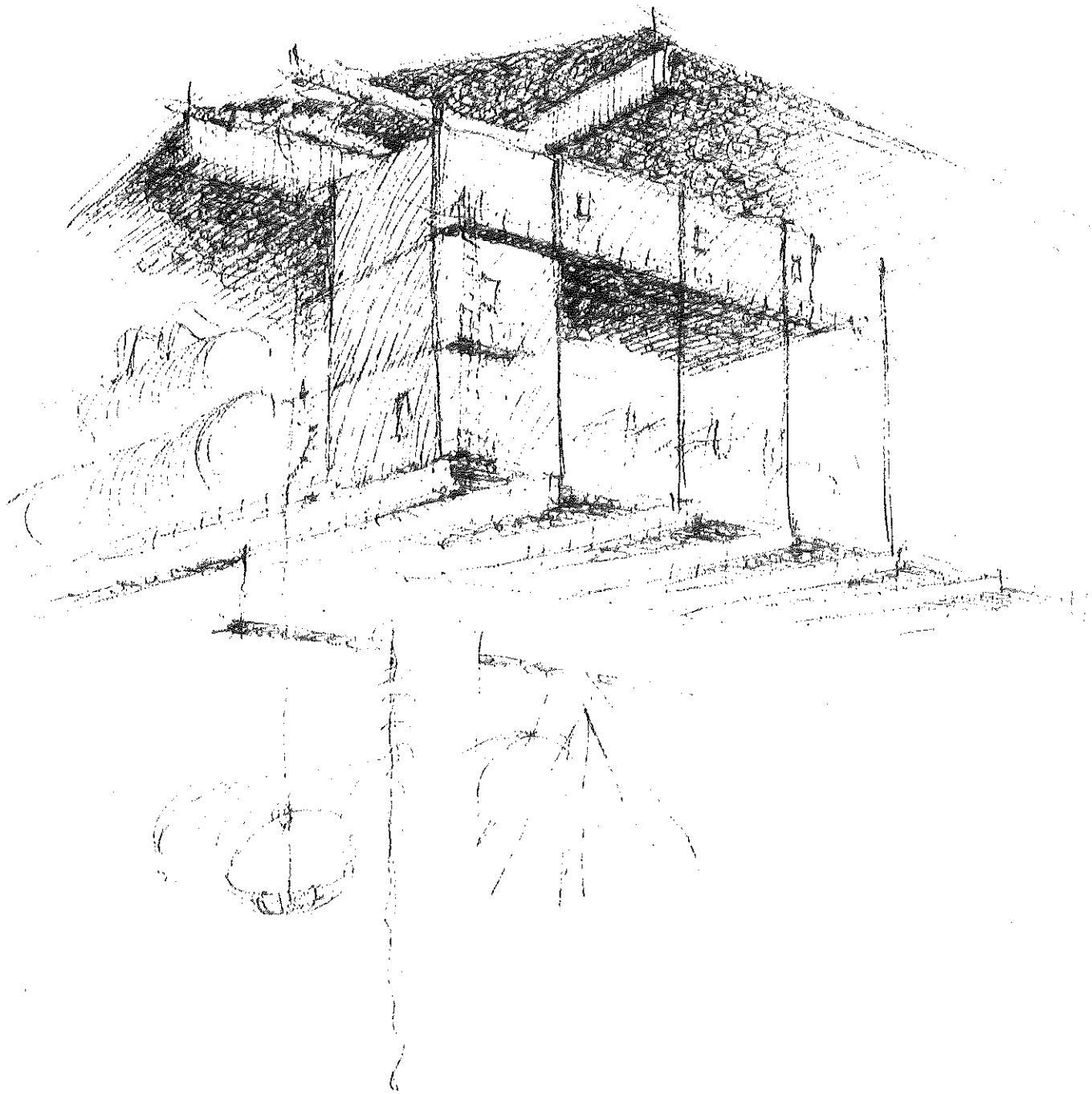
Omission of the rescue capsule altogether reduces the total price by approximately

d.kr. 330.000,-

10. Construction Schedule

Provided tolerable weather conditions during offshore installation the following time table applies:

1.	Design, approbation, offers etc.	9 weeks
2.	Onshore construction, offshore installation of steel structure etc.	12 weeks
3.	Shipping and offshore installation of box units	3 weeks
	Total	approx. 24 weeks



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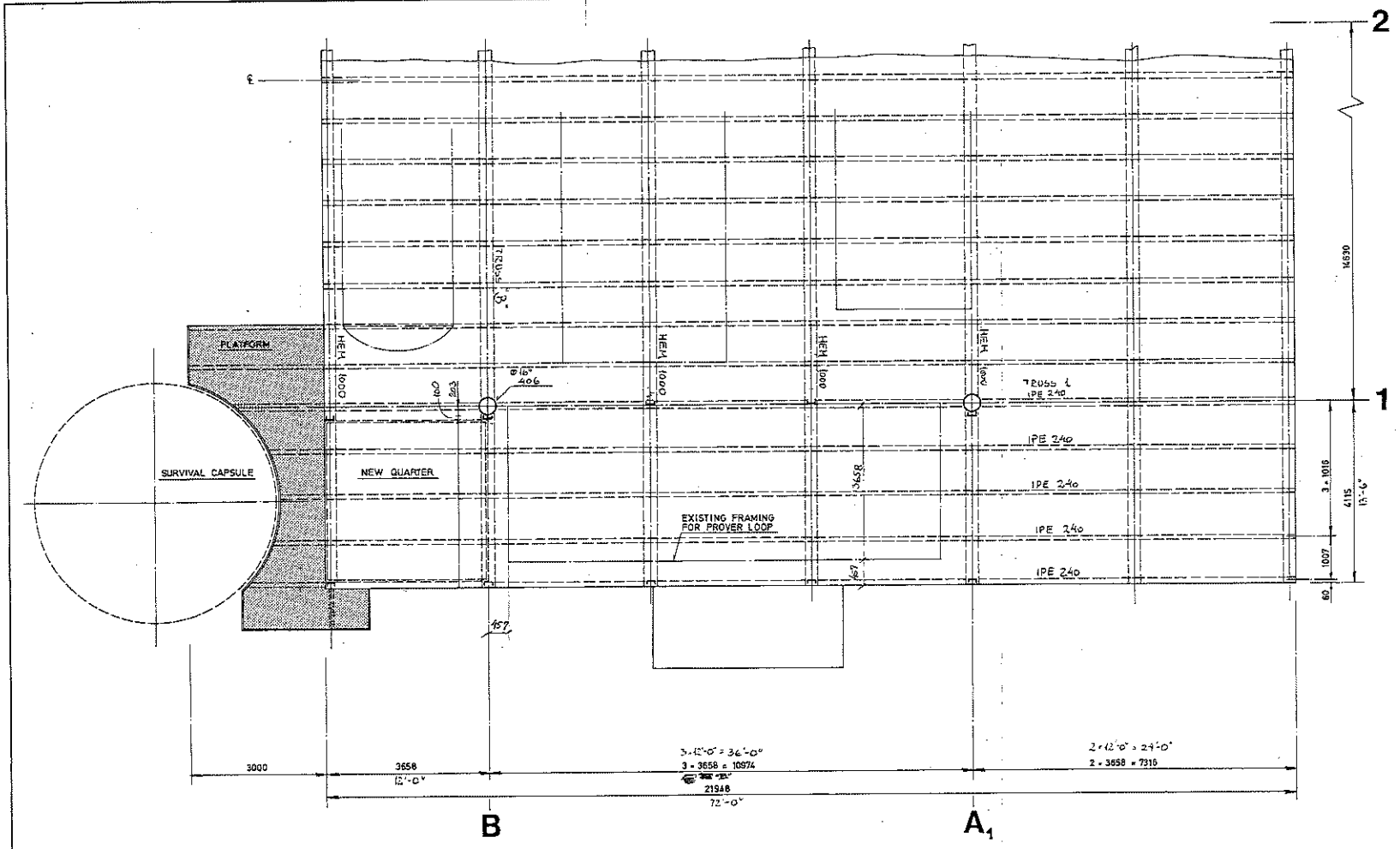

TEGNESTUE

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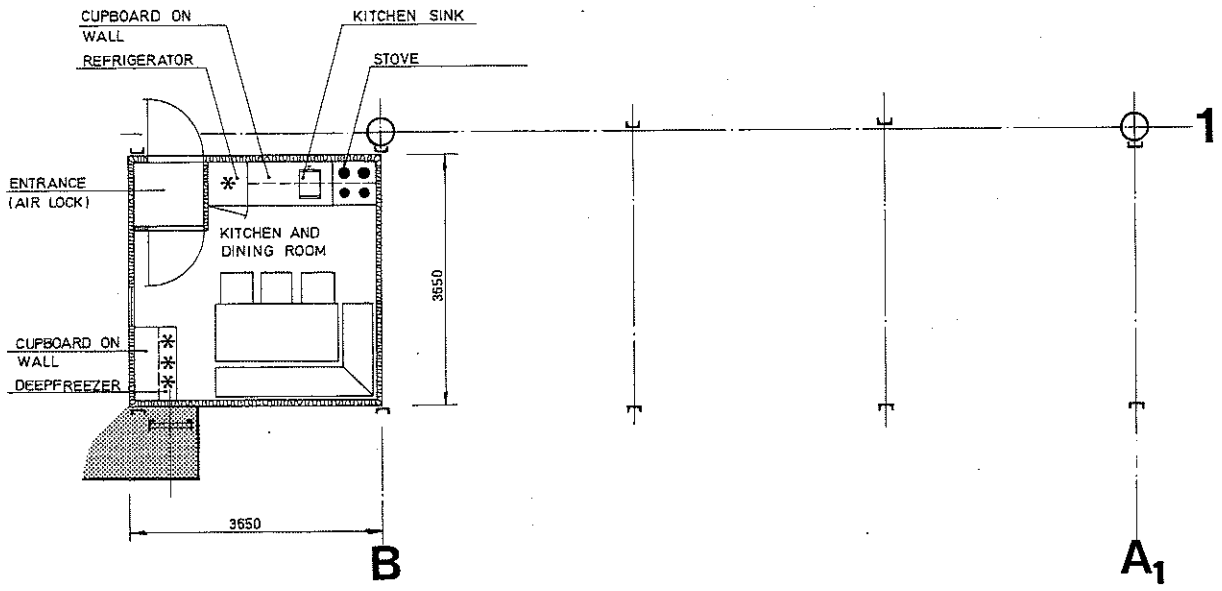
CAMP: 7554	LIVING QUARTERS DAN FIELD "B"	PLAN MAIN DECK	DRW. NR.: K 2-1
DATE: 10.10..75	A B C D E F G H I K L M		SCALE: 1 : 50



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CASE: 7554	LIVING QUARTERS DAN FIELD "B"						PLAN 1 st FLOOR						DRW. NR.: K 2 - 2
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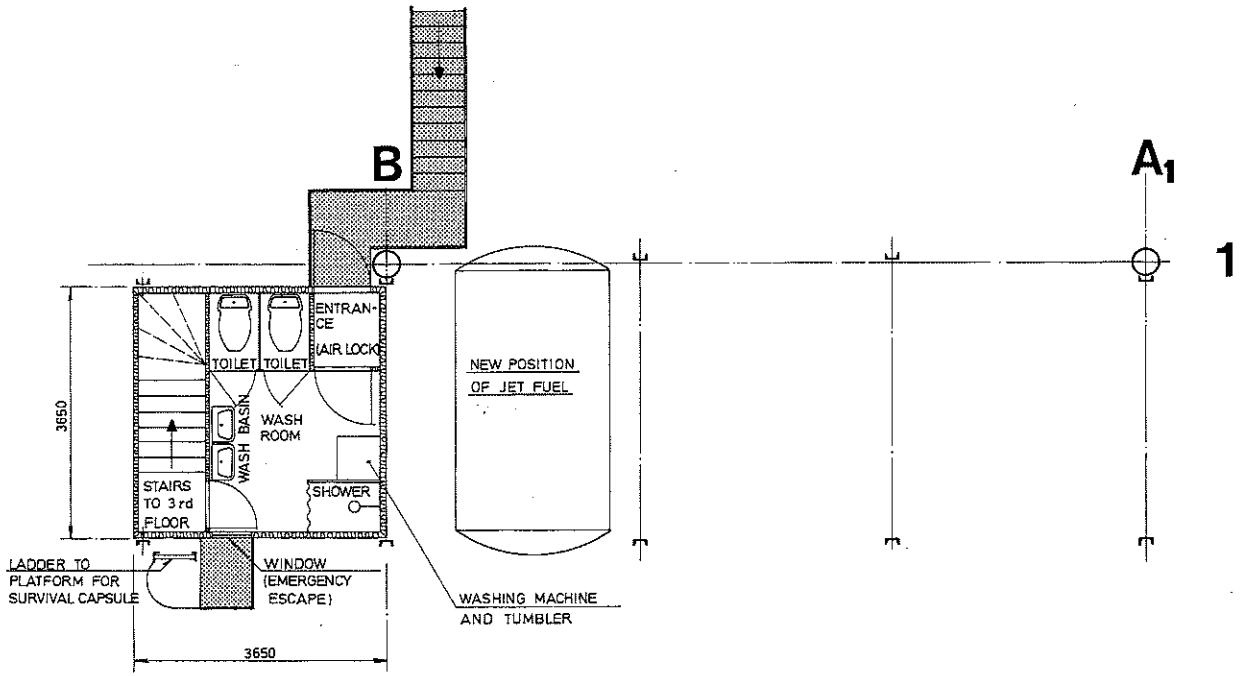

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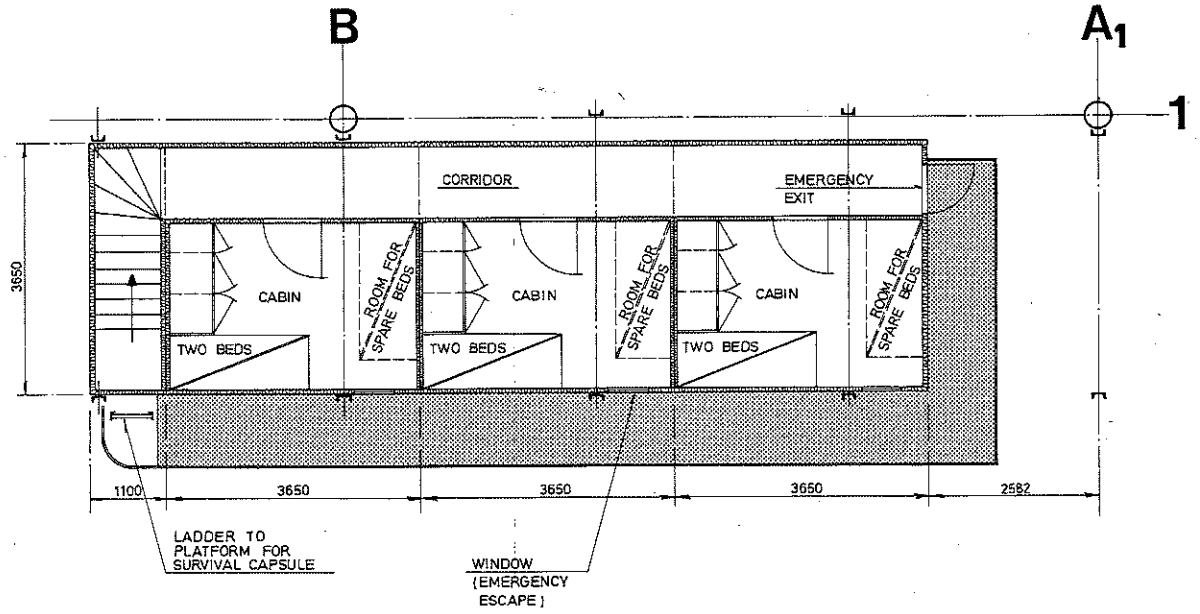
CASE:			DRW. NR.:
7554	LIVING QUARTERS DAN FIELD "B"	PLAN 2 nd FLOOR	K 2 - 3

DATE:	A	B	C	D	E	F	G	H	I	K	L	M	SCALE:
10. 10. 75													1 : 50



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CASE: 7554	LIVING QUARTERS DAN FIELD "B"	PLAN 3 rd FLOOR	DRW. NR.: K 2 - 4
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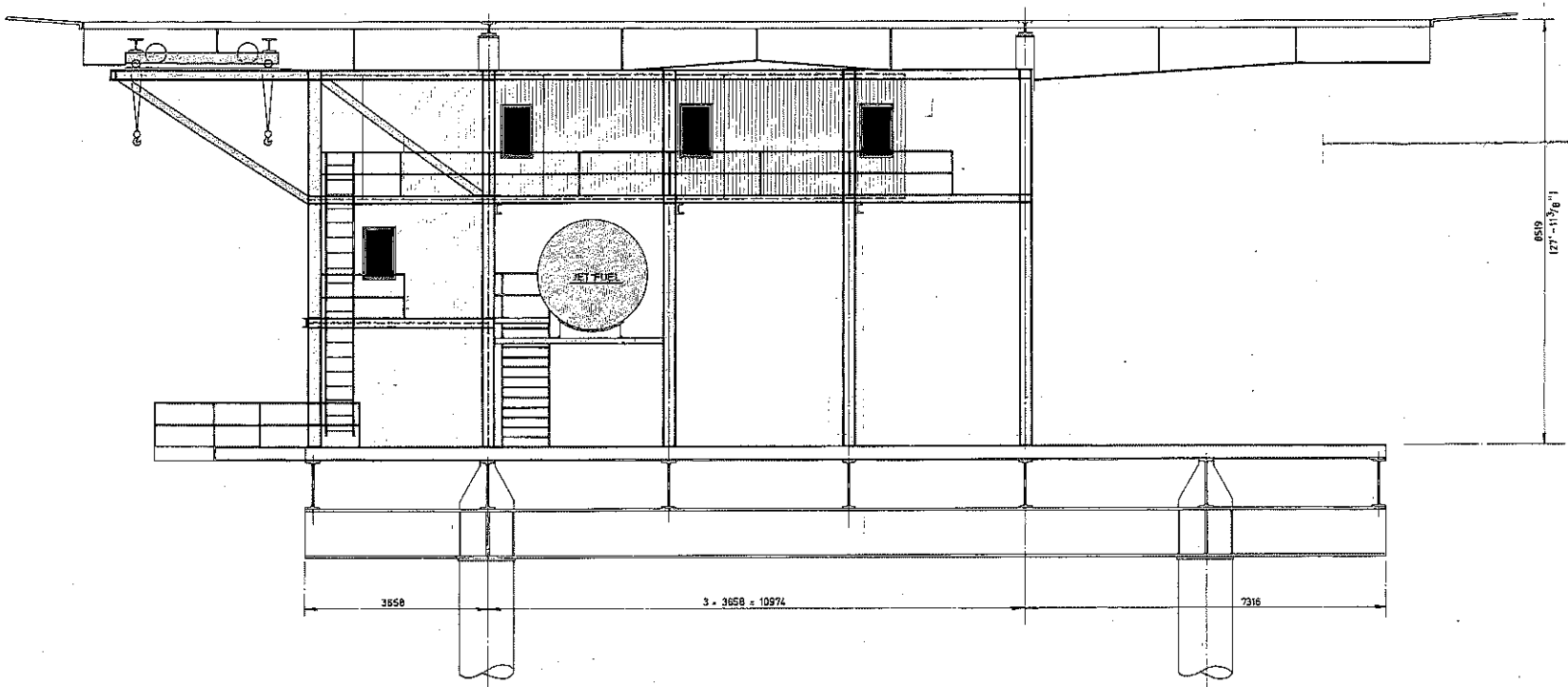

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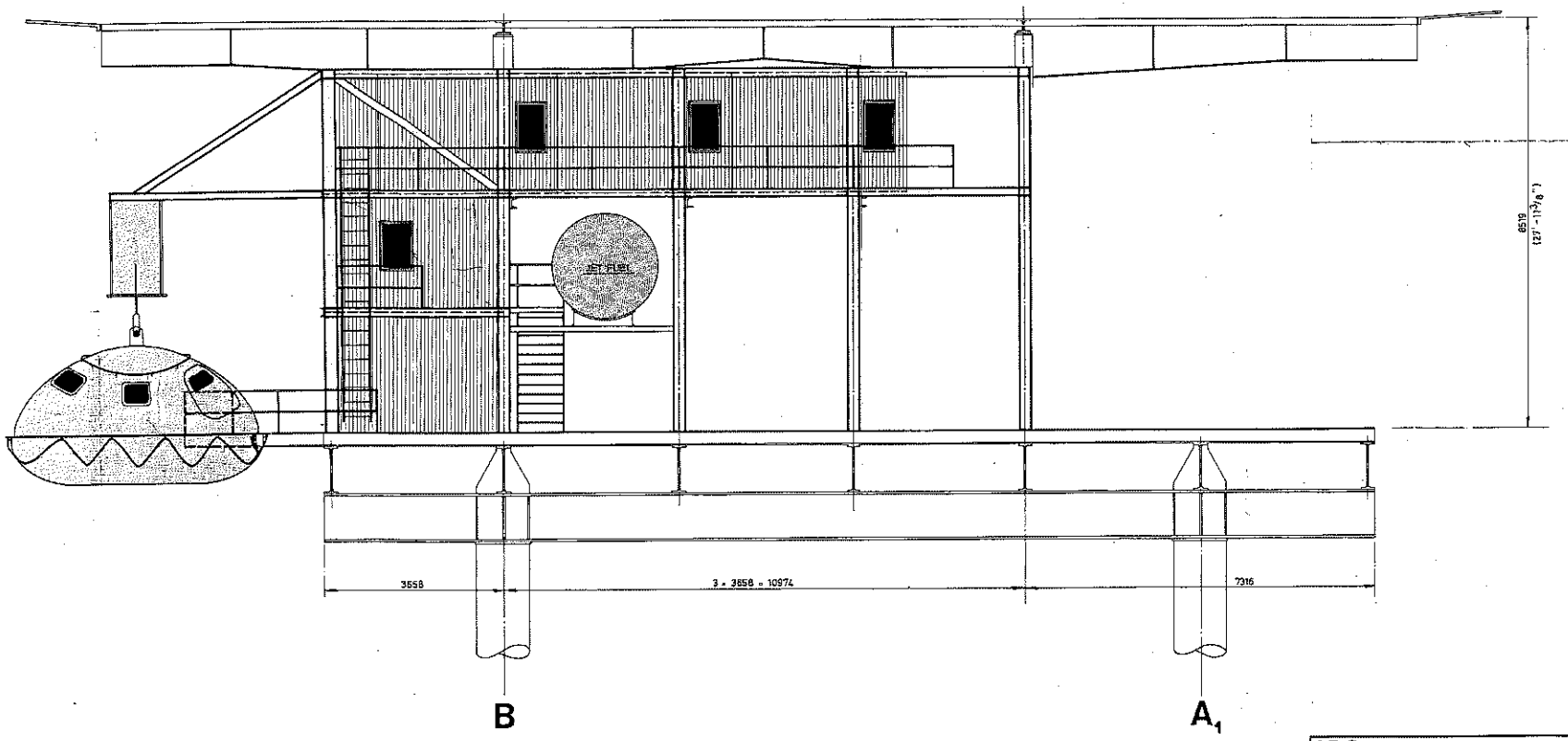

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CASE: 7554	LIVING QUARTERS DAN FIELD "B"	ELEVATION, FACADE.	DRW. NR.: K3 - 2
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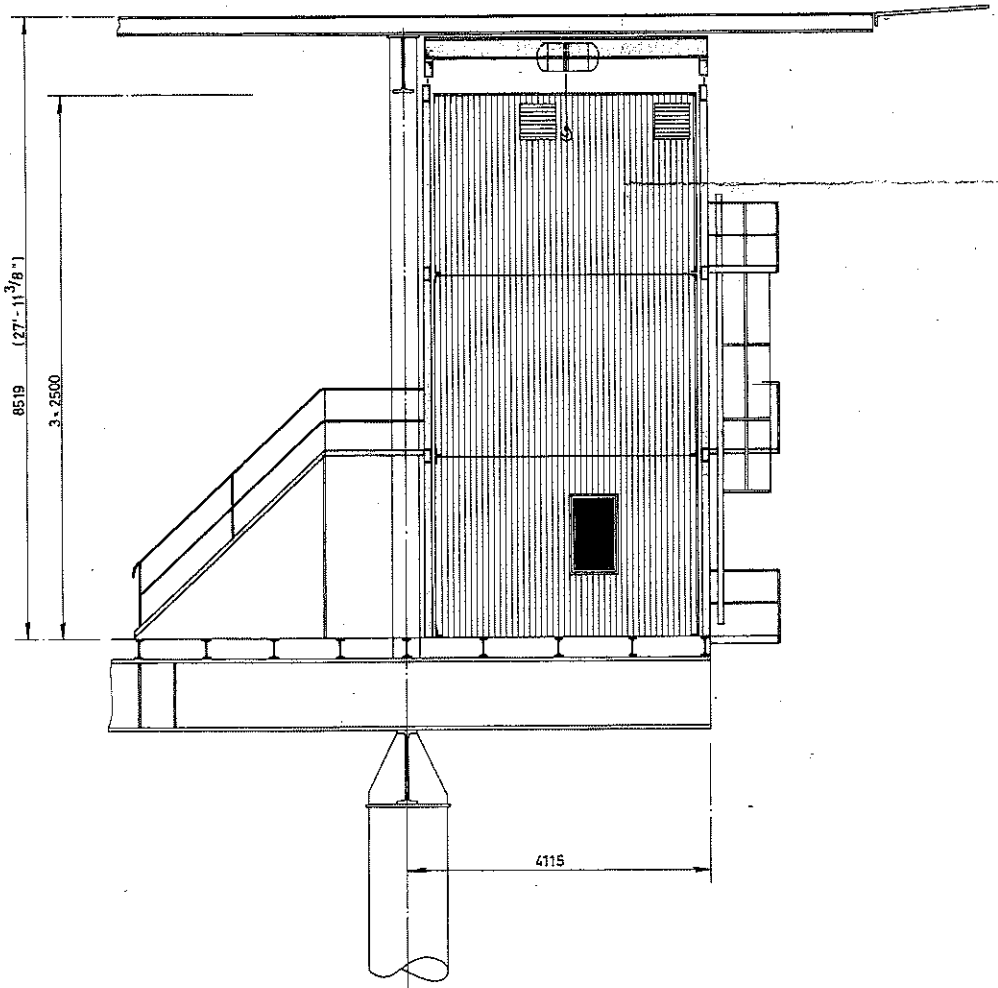

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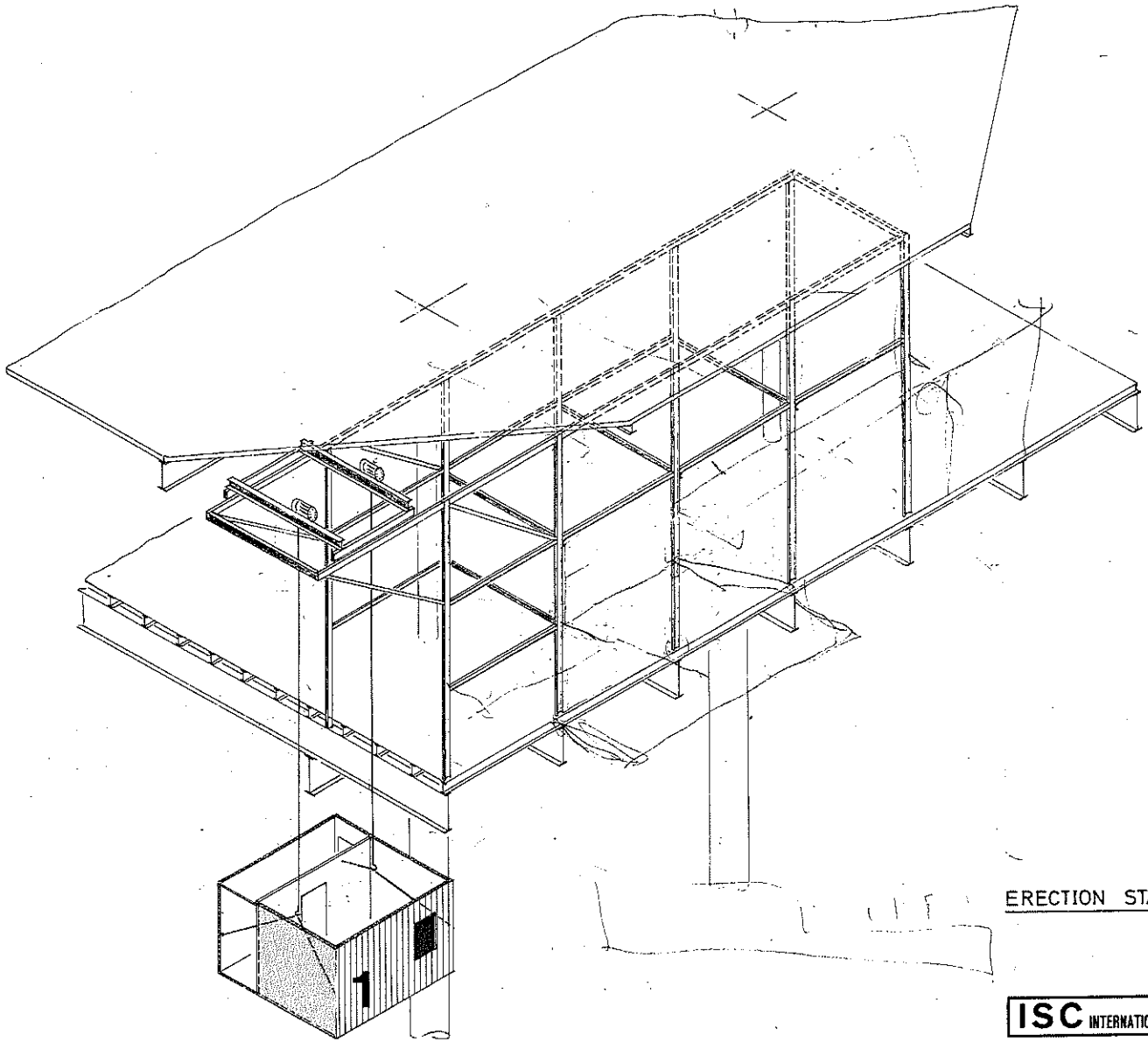

ERECTION STAGE 1.

K4-1

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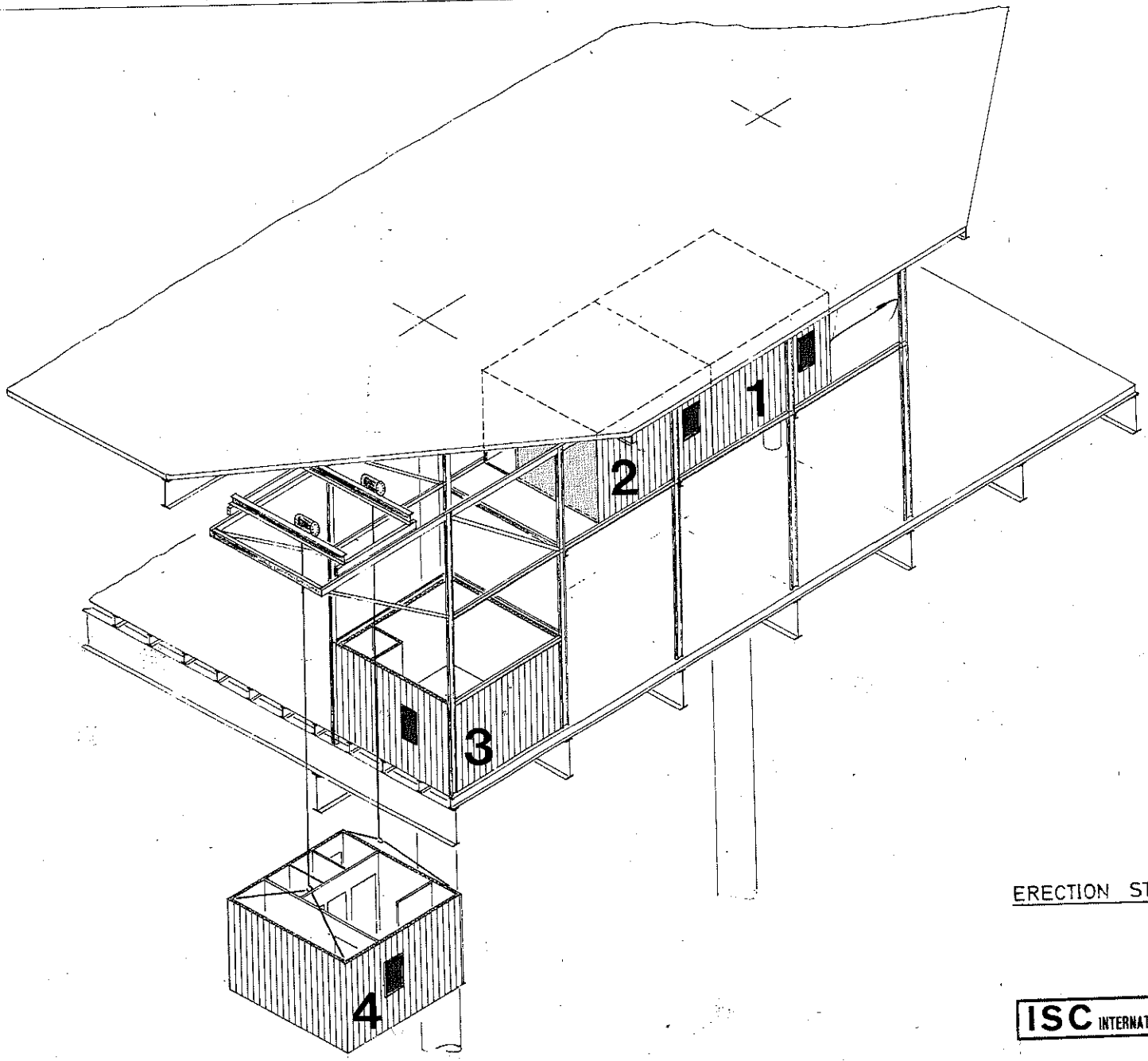

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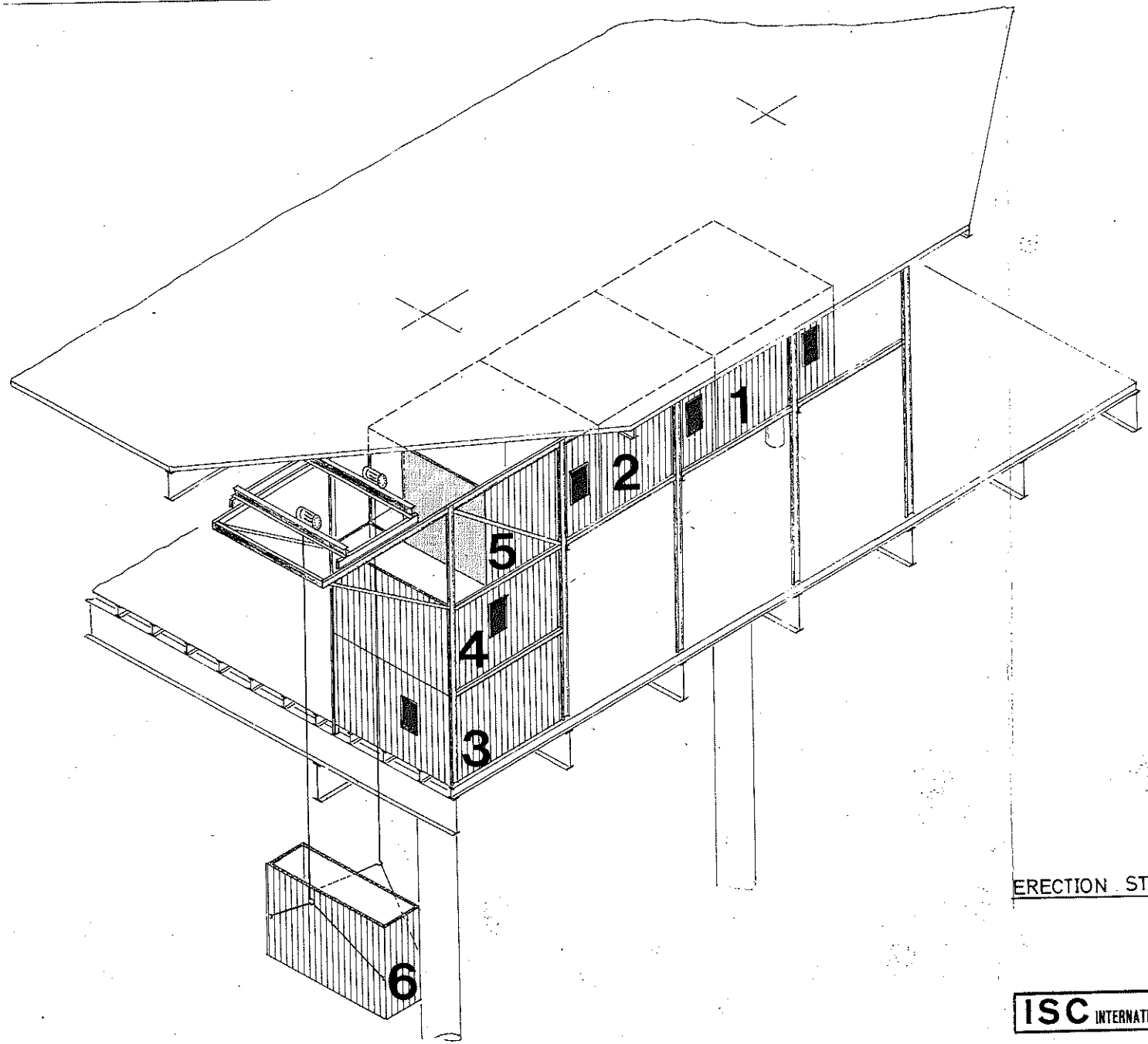

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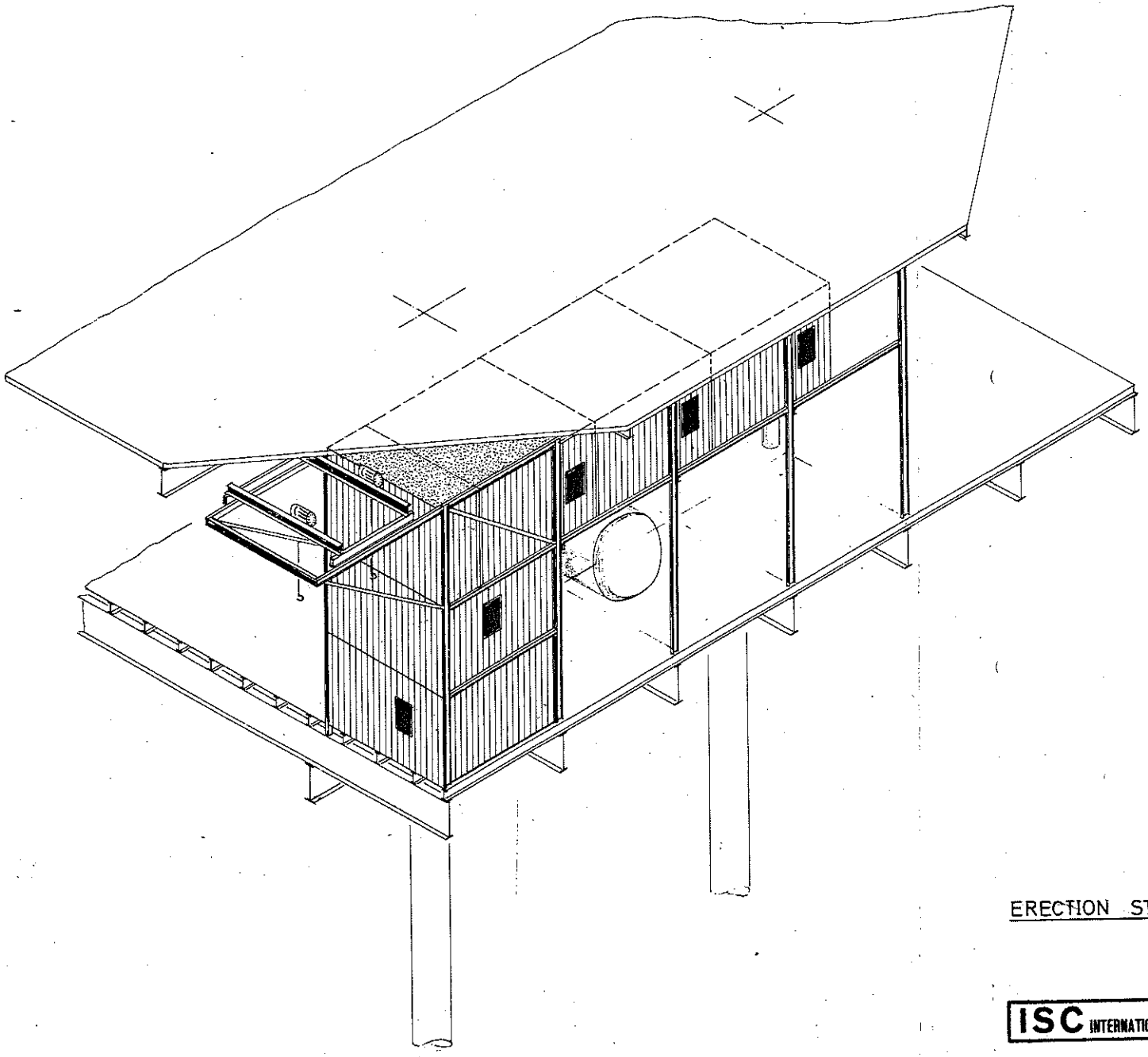

ERECTION STAGE 4.

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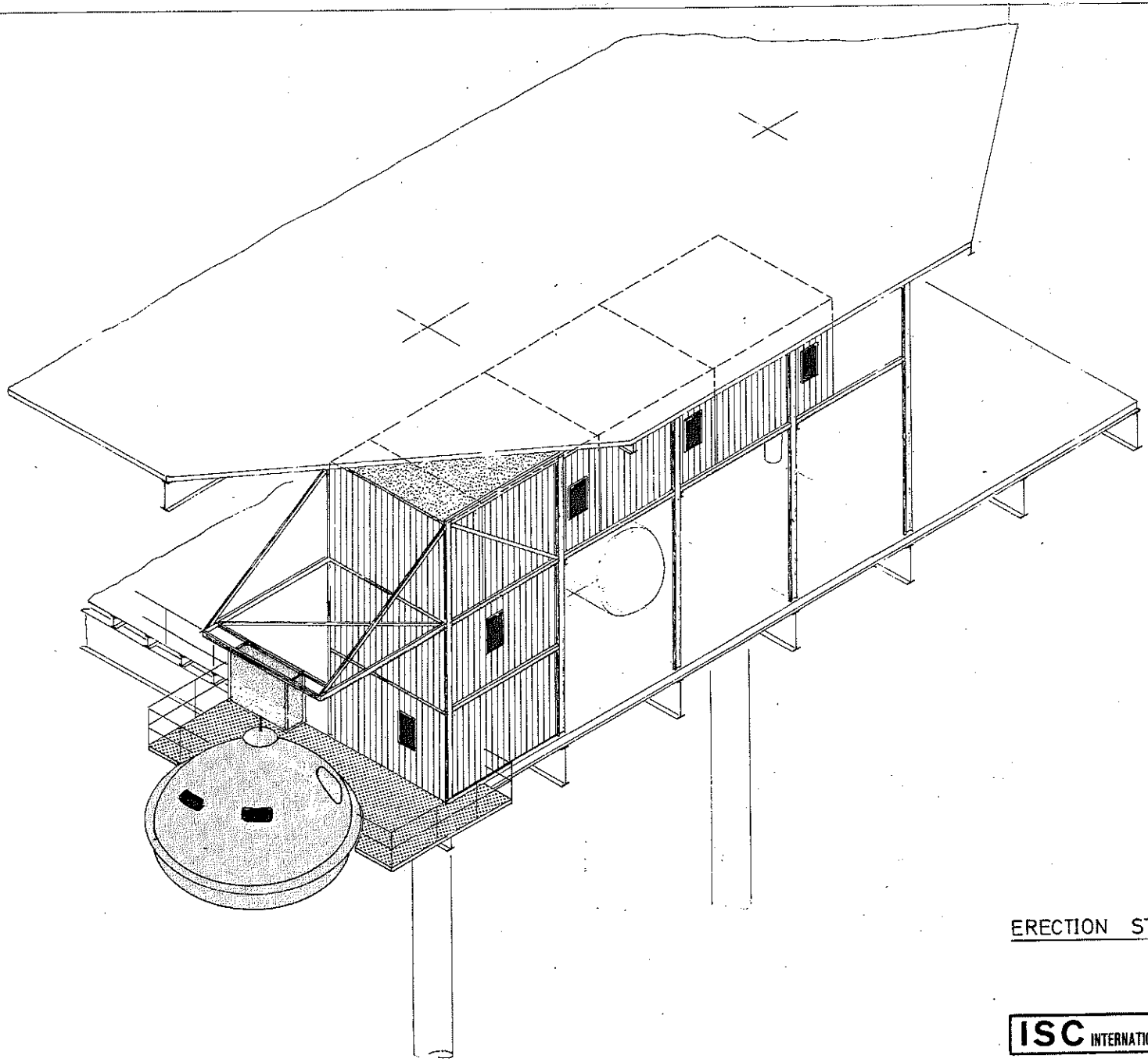

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