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INSTRUKTIONER
ANWEISUNGEN

INSTRUCTIONS
INSTRUCCIONES

INSTRUCTIONS
INSTRUCÇÕES

12951-08

1/17

PACKING OF MACHINE GOODS
EXECUTION OF PACKAGING

Enclosures:

Loading gauges	12951-07-I
Sketch of boxes	12951-08-II
Weight curves for closes boxes	12951-08-III
Weight curves for crates	12951-08-IV
Photos of types of packaging	12950-07-V to 12950-07-XXVIII

In the text, reference is made to
the following instruction manuals:

Execution of orders from FLS	28031
Dispatch of goods	19691
Packing of electrical equipment	34541
General workshop instruction manual	520530-E

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Bemærk!

Nærværende instruktion omhandler de situationer, som vi har erfaring for, er de oftest forekommende. En udtømmende opregning af samtlige tænkelige situationer, som måtte kunne opstå under drift af anlægget/ maskinen/udstyret lader sig ikke gøre.

Vi skal derfor tilråde, at såfremt der måtte forekomme en situation, som ikke er omhandlet i instruktionen, og som kunden ikke er/eller vurderer sig selv fortrolig med håndteringen af, at FLS uden ugrundet ophold kontaktes med henblik på indhentelse af nærmere vejledning.

Note!

The present instruction manual is concerned with the situations which, according to our experience, are the most likely to occur. An exhaustive enumeration of all conceivable situations which may occur during the operation of the plant/machine/equipment cannot be provided. Consequently, if a situation should arise, the occurrence of which is not foreseen in the instruction manual, and which the client is/or feels unable to handle, we would recommend that FLS is contacted without undue delay for advice on appropriate action.

Important!

Le présent manuel d'instructions traite des situations qui, à la lumière de nos expériences en la matière, sont celles que l'on rencontre le plus souvent. Une énumération exhaustive de toutes les situations susceptibles de se présenter au cours de l'exploitation de l'usine/la machine/l'équipement n'est tout simplement pas faisable.

Nous vous invitons par conséquent à contacter FLS sans délai afin de recourir rapidement aux prescriptions plus détaillées dans le cas où il intervient une situation qui n'est pas traitée dans le manuel et que le client n'est pas en mesure d'affronter, ou ne se sent pas en mesure de le faire.

Achtung!

Die vorliegende Anweisung behandelt die Situationen, die unserer Erfahrung nach am häufigsten entstehen. Eine erschöpfende Aufzählung aller denkbaren Situationen, die beim Betrieb der Anlage/Maschine/Ausrüstung auftreten könnten, ist nicht möglich.

Deshalb empfehlen wir, daß falls eine Situation entstehen sollte, die nicht in der Anweisung behandelt ist, und mit deren Bewältigung der Kunde nicht vertraut oder in der Lage ist zu bewältigen, daß FLS ohne schuldhaftes Zögern hinsichtlich der Einholung näherer Richtlinien benachrichtigt wird.

Atención!

Las presentes instrucciones versan acerca de situaciones que, según experiencia obtenida, son las que se originan más comúnmente. No es factible listar una ennumeración exhaustiva de todas las condiciones imaginables que pudieren surgir durante el servicio de la instalación/máquina/equipo.

Por consiguiente, en el supuesto de que se originara una situación que no ha sido tratada en las instrucciones y con la cual el cliente no estima estar familiarizado, o no verse en condiciones de solucionarla por sí mismo, se recomienda tomar contacto sin demora infundada con FLS con miras a solicitar instrucciones de carácter orientatorias.

Observar!

As presentes instruções tratam de situações que, segundo a experiência obtida, são as que aparecem com mais frequência. Não é viável uma enumeração exaustiva de todas as condições imagináveis que possam surgir durante o serviço da instalação/máquina/equipamento.

Por conseguinte, no caso de surgir uma situação que não tenha sido abordada nas instruções e com a qual o cliente estima não estar familiarizado, ou não estar em condições de a solucionar, recomenda-se contactar sem demora a FLS a fim de solicitar instruções de carácter orientativo.

1. GENERAL

1.1

FLS-packagings are export packagings, intended for transport by, e. g. truck, rail and ship, respectively, and for handling during several trans-shipments.

It must be possible to stack the packagings and they must withstand lengthy storage during shifting climatic conditions.

1.2

The packagings recommend by FLS for different types of goods are shown in the packaging instructions (section 2).

The types of goods have been determined on the basis of the size of the individual piece of goods and the resistance of the goods to transport and storage.

Typical examples of FLS machine products are shown in the packaging instructions.

The type of goods and the packaging can be determined by comparing the goods covered by a given order and the shown examples.

The packaging instructions (section 2) do however not apply, if the order or the technical specifications, e. g. workshop instructions, packing directions or packing drawing, include packaging instructions.

1.3

FLS use the following packaging designations:

Case	Cable reel
Crate	Bundle
Carton	Pallet
Drum/barrel	Unpacked

1.4

For execution of packagings, see sections 2, 6, 7, 8 and 9.

For special packagings, see sections 10 and 11.

If the packaging corresponds to one of the packagings specified in sub-section 1.3, the packaging designation must be used in the dispatch note and invoice to FLS. If not, a generally accepted designation must be used.

2. INSTRUCTIONS FOR PACKAGING

2.1

The table for the packaging instructions, (pages 4 and 5) is for guidance when determining the packaging.

2.1.1

Example:

One change-over gate to be packed.

Since the change-over gate is forwarded as an assembled unit, which is made of thin sheet and cannot withstand impacts, the packaging appears from the type of goods:

Complete machines, which cannot withstand impacts.
According to the table, this type of goods must be
packed in a crate. See photo No. 42.

Note: Ask our inspector if there is any doubt regarding the selection of packaging.

Table of packaging instructions.

Type of goods	Product examples	Packaging	Photo No.	Remarks
Steel goods which cannot withstand impacts	Lining pieces for mill trunnions Wear plates for kiln inlet	Crate		
Small steel goods	Lifters for Unax coolers Wearing plates for elevators T-teeth for elevators	Crate	2	
Steel goods, rigid	Gear rims for mills and kilns Live rings for kilns Scooping devices for mills Sector's Outlet frames for kilns Hammers for hammer crushers Hammer discs and arms Wheel paths for elevators Drag chains	Unpacked	3 4 5 6 7 8 9	Protect joint faces with wood. Fit 4 bandages for strapping. Bolt them together two and two. Bolt the parts together. Gross weight max. 1000 kg. Bolt diameter max. 30 mm. Bolt them together two and two Bundle the chains
Cast iron and Ducrodan	Pipe bends Pump housings Inspection doors and hatches Manhole covers	Crate	10	
Sheet structures which cannot withstand impacts	Fluxo slide sections, type D and E Screw conveyor section Grates and chequered plates	Crate	11 12	
Plate constructions rigid	Suspension rings for kiln chains Inlets for Unax coolers Unax cooler tubes Feed boxes for Fluxo pumps Tanks for Fluxo pumps Downpipes Air receivers Cyclone sections which are bolted together Conditioning tower sections which are bolted together Front and back plates and housings for exhaust gas fans Discharge casings	Unpacked	13 14 15 16-17 18 19-20 21 22 23	To be placed in transport frames. Bolt the parts together
Frames of sectional iron and gratings	Ladders and gangways Expansion joints for exhaust gas pipes Loading conveyors	Unpacked	24 25	Bolt the parts together Bolt the parts together Bolt the parts together
Lengths of pipes and sectional iron	Longitudinal girders for Polax grates Iron girders for burner station Various sectional parts and pipes for installations	Bundle	26 27-28	

Table of packaging instructions, continued.

Type of goods	Product examples	Packaging	Photo No.	Remarks
Round steel chains	Chains for elevators Chains for kilns	Bundle	29-30	Gross weight approx. 500 kg per bundle
Chains with flat steel links	Chains for apron feeders Chains for elevators	Crate	31	Keep space between box boards so narrow that chains do not fall out.
Machine components, vulnerable	Counterweights for Fluxo packer	Case	32	
	Precision-machined chain and gear wheels Bearing liners, seals and shafts Hydraulic equipment		33	
Machine components which cannot withstand impacts	Bearing housings for kilns and mills Impellers for fans and air separators Screen frames for vibrating screens Air separator casings for louvres Gear wheels for elevators and apron conveyors	Crate	34	
Machine components, rigid	Elevator components Burner pipes	Unpacked	35	Protect vulnerable parts
			36	Protect vulnerable parts
Small machine components and tools	Couplings Intermediates Small lots of bolts, screws and nuts Hoses and packings Ball bearings Valves and piping parts Fork spanners	Case Case		Line the case
Small machine components, large lots	Bolts, washers	Drum or case	39	The drum must have beaded cover
Welding electrodes		Case	40	Electrodes must remain in the original packages. Line the case.
Complete machines, vulnerable	Compressors Belts for Dosimat feeders Burners	Case	41	Cover measuring and electrical equipment with plastic sheet
Complete machines which cannot withstand impacts	Change-over gates Hoisting dampers Double flap valves Change-over valves Throttle valves Sluice flaps	Crate		
Complete machines, rigid	Disc valves Apron feeders	Unpacked	44	To be forwarded divided if lengths exceed 6 m.

3. MODES OF DISPATCH AND DISMANTLING OF GOODS

3.1

Large pieces of goods must be dismantled or taken apart according instructions on drawings, taking into account the limits of dimensions and weight of the transportation means.

Photo No. 19 shows parts of a dismantled, large cyclone.

3.2

The examples below cover some of the most ordinary means of transportation used in Europe.

Truck:

Tarpaulin trailer/semi-trailer with 1 double axle and 3 single axles.

Max. length x width x height =
11500 x 2420 x 2480 mm.

Max. transport mass = 27500 kg.

Railway waggon:

Danish goods waggon, type Rs.

Max. length:	18500 mm
Max. width:	2740 mm (inside dimension)
Max. height:	See enclosure I
Max. transport mass (weight):	From 32000-55000 kg depending on goods length.

Ship:

Always ask your Shipping Department for the max. transport dimensions and mass, because these size requirements depend on which ship is to carry the goods.

4. MASS AND PACKING OF PACKAGES

4.1

The mass of a package of packed goods must normally not exceed 2000 kg.

Avoid small packages, if possible, because they easily get lost during transport. Machine parts must be packed in the same box as the machine they belong to is packed.

The mass of unpacked, small goods, which is assembled, must not exceed 1000 kg. per package. See photo No. 8.

Normally, only goods bearing the same order number may be packed in the same package.

4.2

Prior to packing, drain gear units, etc. of oil.

5. GOODS IN BOXES

5.1

Stiffen the goods so that the box can be placed in an arbitrary position without the goods becoming displaced. See photo No. 47.

Place the goods so that the mass in the box is distributed as evenly as possible.

To avoid damaging the box when lifting, the stiffening must rest on the most rigid points of the box structure, and the surface pressure must be distributed as evenly as possible on the bottom of the box.

The goods must not serve as part of the box stiffening.

5.2

Bright surfaces must not come into direct contact with wood. Protect the surfaces with the specified rust-proofing agents and place impregnated kraft paper between wood and surfaces.

5.3

Make sure that small, loose parts do not damage each other during transport. Fill spaces with shock-absorbing, waterrepellent material. See photo No. 37.

Never fill spaces with e. g. wood shavings, straw or paper.

5.4

If goods in cases (see section 2) must be protected against intruding water, the boxes must be provided with a lining.

One of the following lining materials must be used:

Oiled paper, (waxed paper)
Impregnated kraft paper
Plastic sheet (polyethylene, min. thickness 0.07 mm).

Line the boxes so that intruding water may flow out again.

5.5

Protect machines provided with, e. g. instruments or valves which cannot withstand splash water. Cover the machine with plastic sheet which is closed at the sides and serves as a cap.

5.6

Protect electrical components against moisture, e. g. electric motors or microswitches, when forwarded together with machine goods. Pack electrical components in plastic sheet.

5.7

Dismantle electrical control equipment (e.g. small panels) and pack it according to separate instruction manuals.

6. UNPACKED GOODS6.1

To reduce the number of packages as much as possible, proceed as follows:

A: Bolt the parts together directly (see photo No. 22) or by means of retainer irons, see photo No. 26.

B: Weld butt-straps on goods which have no holes, see photo No. 16.

C: Place loose parts, e. g. flanges, in cavities, if any, (see photo No. 23) and fasten the parts carefully to the package.

6.2

If required, fasten the goods with stiffening irons, see photos No. 15 and 19.

6.3

Make sure that the goods are prepared for hooking. Weld, e. g. fittings for lifting to the goods (see photo No. 35), or drill holes in retainer irons, if any, see photos No. 21 and 24.

6.4

Protect parts, e. g. shaft ends or precision-machined flanges, with wood, see photos No. 45 and 46. Insert impregnated kraft paper between wood and object, see sub-section 5.2.

6.5

Electrical components and mechanical instruments which have been trial-mounted must be dismantled prior to shipment and be packed in a closed box or container. If so, see instruction manual No. 34541.

7. EXECUTION OF BOXES

7.1

Make the boxes of dry, sawn and full-squared wood of an acceptable quality.

Use whole boards. Only very large boxes may be assembled by means of the finger-joint method, see enclosure II, Fig. 2.

7.2

Dimensioning of boxes and the mode of assembly are identical for crates and for cases.

Provide the boxes with outside battens on sides, top and bottom, respectively, and with vertical end boards. See enclosure II.

Wood and nail dimensions depend on the net mass. For selection of dimensions, see table A.

The board width dimensions are for guidance only. The width must, however, not be chosen smaller than the dimension against the net mass specified in the table.

Adhere to the board thickness specified in the table.

Dimensioning of boxes
Table A.

Mass (weight) of goods	Wood dimensions			Nail length	Iron angles on battens
	Boards	Side and top battens	Bottom battens		
kg	mm	mm	mm	mm	
0 - 100	19 x 100	25 x 100	50 x 100	80	from 1800 kg and heavier
100 - 250	25 x 125	25 x 125	50 x 125	80	
250 - 400	25 x 125	25 x 125	50 x 125	90	
400 - 750	25 x 125	32 x 125	50 x 125	90	
750 - 1500	32 x 125	32 x 125	50 x 125	100	
1500 - 2500	32 x 125	38 x 150	75 x 150	100	
2500 - 3500	38 x 150	38 x 175	75 x 175	130	
3500 - 6000	38 x 150	50 x 175	75 x 175	130	

Some crates must be provided with diagonal braces on sides and ends to give the box the necessary strength. The bracing boards must have the same dimensions as side battens and vertical end boards, respectively.

If required, provide crates with diagonal bracing in the following instances:

- A: If the contents may be damaged by pressure from the side faces of the box, e. g. due to stacking in several layers.
- B: When the box contains heavy goods.
- C: When the box height is larger than its width.

7.3

The package mass (tare) of a case can be found by means of the curves on enclosures III and IV, on the basis of the shipping volume in m^3 ($l \times b \times h$) and the goods mass (weight) in kg.

The mass specifications on the enclosures are theoretical, because the wood may contain some water which increases the mass (tare).

7.4

Positioning of battens on boxes with lengths up to 3 m.

Position the battens so that the distance from either box end and to the battens corresponds to approx. $1/4$ of the box length. See enclosure II.

7.4.1

Positioning of battens on boxes with lengths exceeding 3 m.

Place the 2 outer battens so that the distance from either box end and to the battens becomes approx. $3/4$ m. Next, place the other battens/batten so that the mutual distance between the battens becomes approx. 1 - 1.5 m.

7.4.2

Make the iron angles for the battens of min. 2 mm sheet and with a width corresponding to the batten width, see photo No. 48.

The angle sides must be min. 250 mm long and have min. 5 nail holes, see photo No. 48.

7.4.3

Bearers for inside stiffening must have min. 50 mm thickness.

Make the crates so that the space between the boards corresponds approx. to the width of one board.

In case of particularly vulnerable or small goods, it will be necessary to have less space between the boards.

Make sure that outer top and bottom boards extend beyond the end boards, because the corner joints contribute considerably to the strength of the box. See enclosure II.

7.4.4

Clinch the nails on the inside of the box. Make sure that the nails are hammered down entirely before clinching them.

Use at least 2 nails for the joint between two faces or one face and one edge. See enclosures II.

Use at least 3 nails for joints at the end of side boards, top boards and bottom boards, if the board width is 150 mm or more.

Place the nails so that the distance from the board edges to the nails corresponds to 1/4 of the board width.

Use only 1 nail where the board face rests against cross-cut timber.

Use 1 nail every 30 cm for joints between the two outer top boards/bottom boards and side boards, respectively.

8. DANGEROUS GOODS

8.1

Packaging and the size of the unit to be forwarded depend on the danger class of the substance and the mode of transport. Examples of dangerous goods:

- A: Indicators containing radioactive substances.
- B: Acid
- C: Paint
- D: Oil
- E: Glue

Packaging must be done carefully in compliance with the regulations in force.

Note:

Ask our inspector or the forwarding section in the Shipping Department, if there is any doubt concerning packaging.

9. NON-FLS GOODS

9.1

Non-FLS goods comprise machine goods and other goods not manufactured by FLS.

9.2

When selecting packaging for these goods, the packaging instructions in section 2 apply in most instances when comparing the goods with these types of goods.

Make the boxes in compliance with the requirements specified in section 7, with regard to dimensioning and assembling the boxes.

If the supplier considers his own packaging to have a quality that corresponds to FLS-packaging, it must be approved by FLS beforehand.

10. SPECIAL PACKAGING

10.1

In some instances special packaging is specified, differing from the instructions given in the previous sections.

When using special packaging, this may e. g. be due to climate, local requirements, type of goods or mode of dispatch.

Examples of special packaging:

- A: Reflecting material for protecting black plastic tubes against sunlight for shipments to tropical countries.
- B: Packaging consisting of compregnated wood for shipments to Australia.
- C: Packaging consisting of corrugated fibreboard for small pieces of goods, to be forwarded by plane to airports where storage conditions are good.
- D: Containers used widely for transporting a variety of goods.

11. PACKAGING FOR LOCAL TRANSPORT

11.1

Local transport is transport over short distances involving little risk of damage to the goods which are protected during short-term storage.

Local transport is used, e. g. for shipments between two suppliers or between supplier and packaging company.

For local transport it is not necessary to directly adhere to the packaging instructions in section 2.

For these purposes, less rigid packaging may be used, e. g.:

- A: Box pallets for small steel goods.
- B: Pallets for machine components which cannot withstand impacts.
- C: Plywood boxes for vulnerable machine components.

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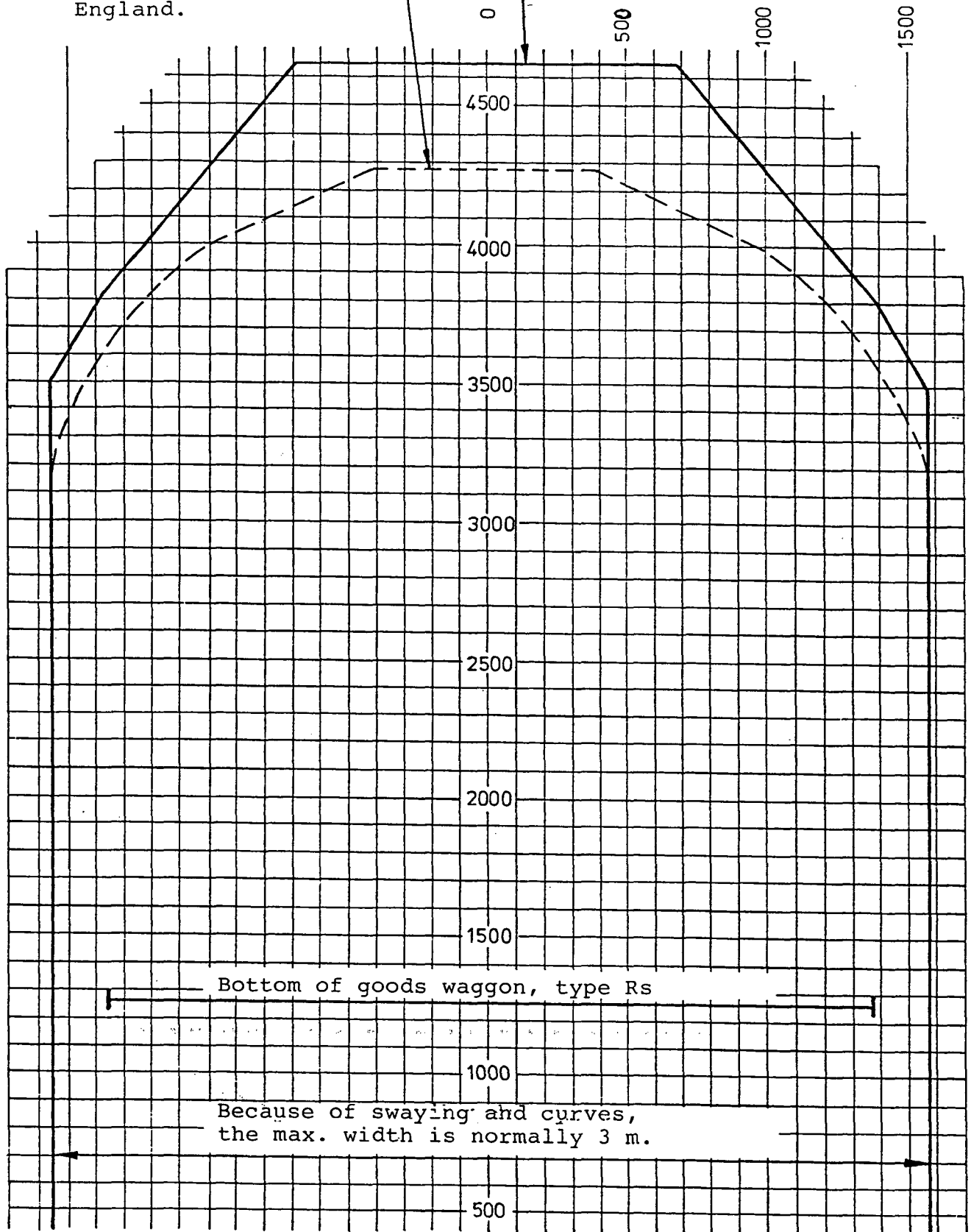
LOADING GAUGES

International gauge

applies to Europe and some Arab countries. Does not apply to England.

Danish gauge

Applies, e.g. also to Germany, Poland and Austria.



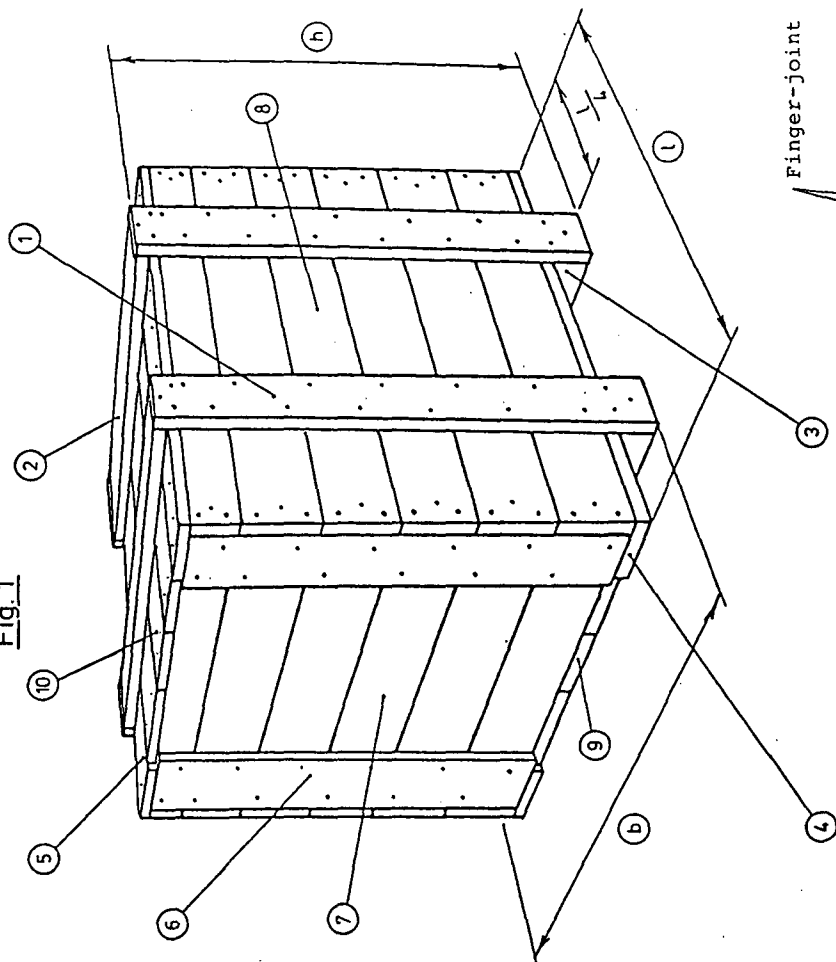
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CASE

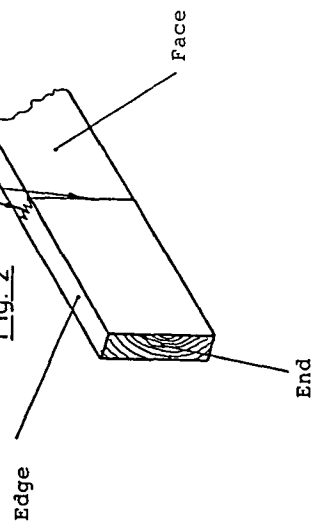
Fig. 1



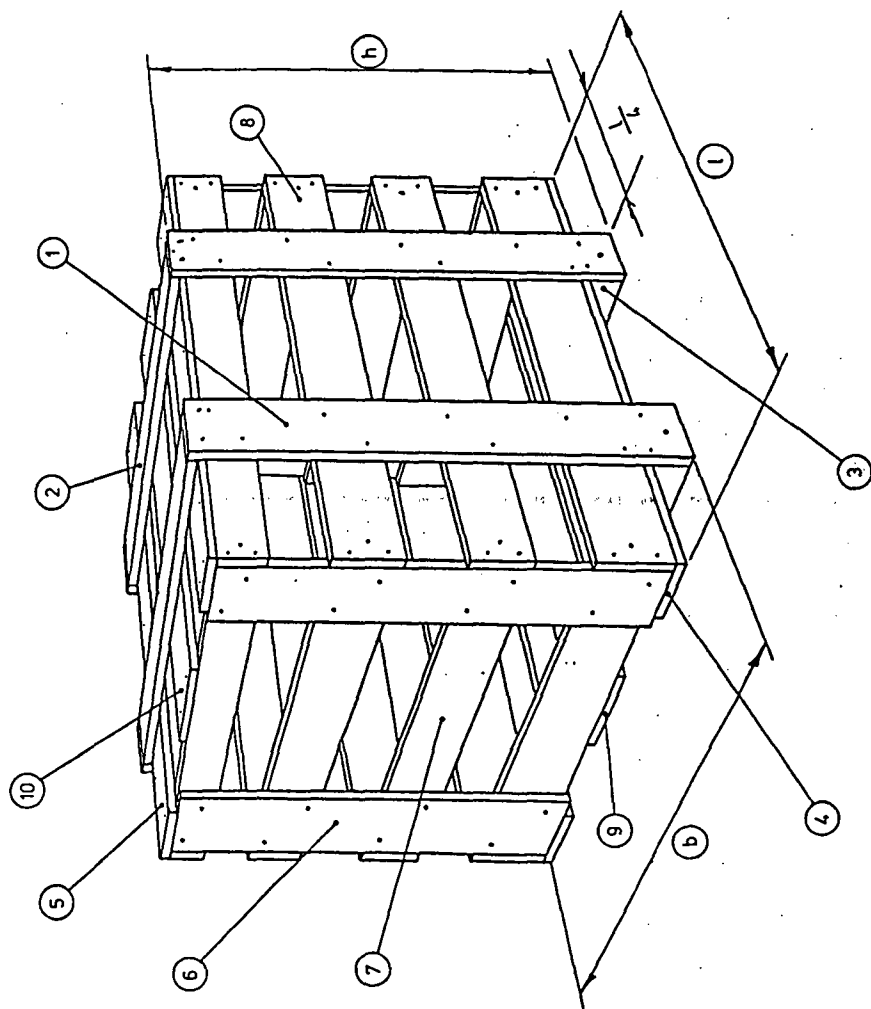
- (1) Side batten
- (2) Top batten
- (3) Bottom batten
- (4) Outer board (bottom)
- (5) Outer board (top)
- (6) Vertical end board
- (7) Horizontal end board
- (8) Side board
- (9) Bottom board
- (10) Top board

(1) Length
(b) Width
(h) Height

Fig. 2

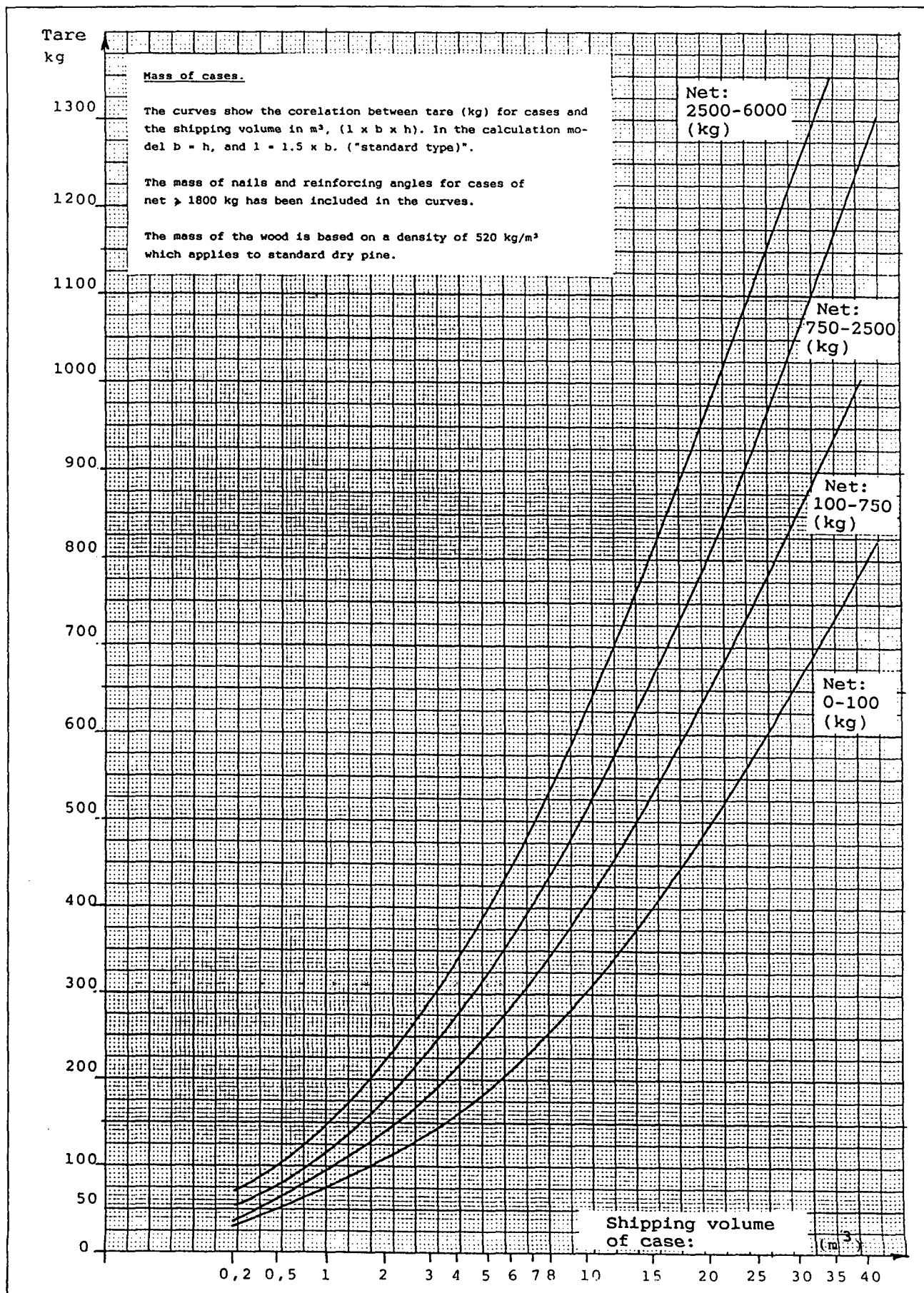


CRATE



(1) Length
(b) Width
(h) Height

- (1) Side batten
- (2) Top batten
- (3) Bottom batten
- (4) Outer board (bottom)
- (5) Outer board (top)
- (6) Vertical end board
- (7) Horizontal end board
- (8) Side board
- (9) Bottom board
- (10) Top board



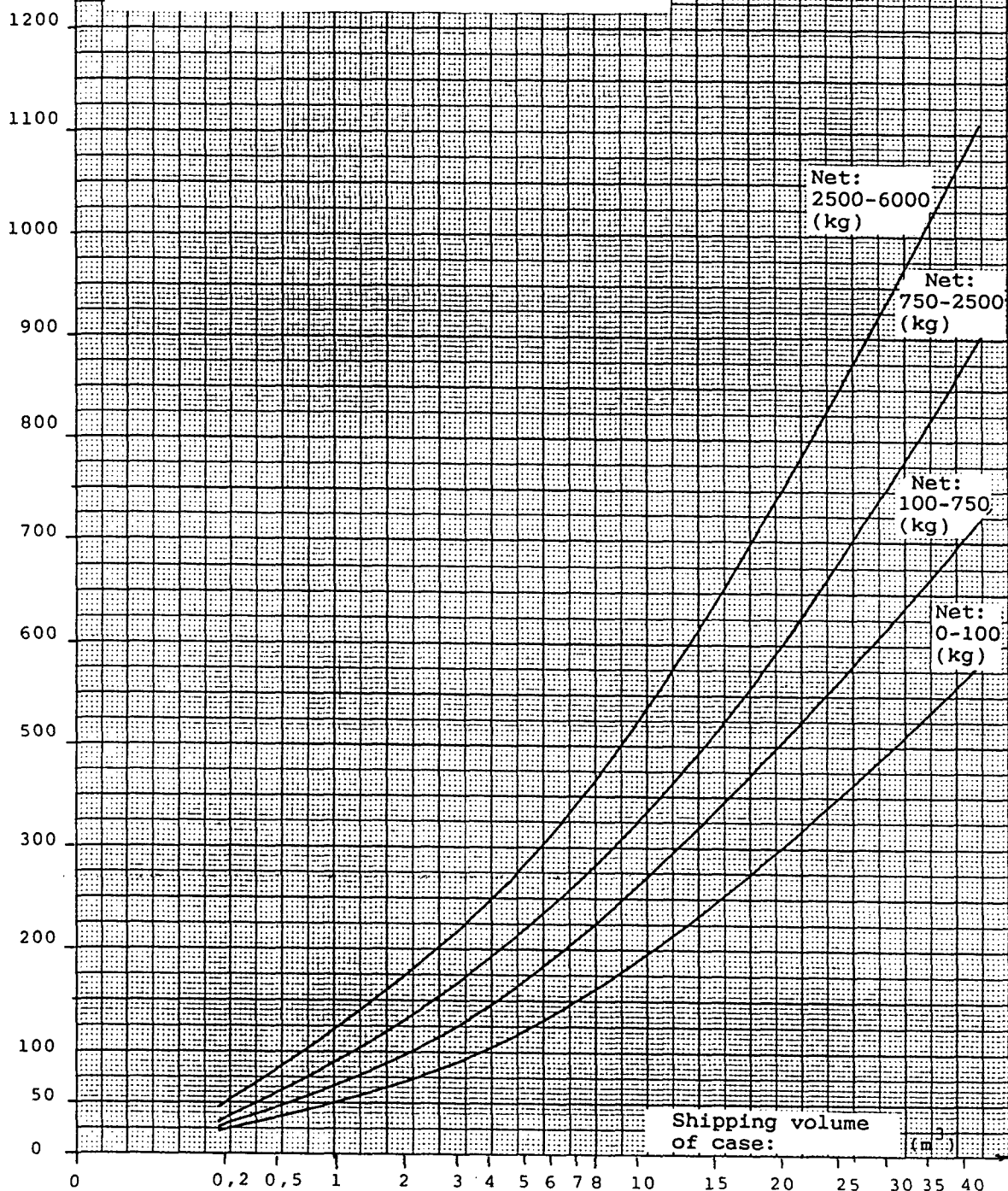
Tare:
kg

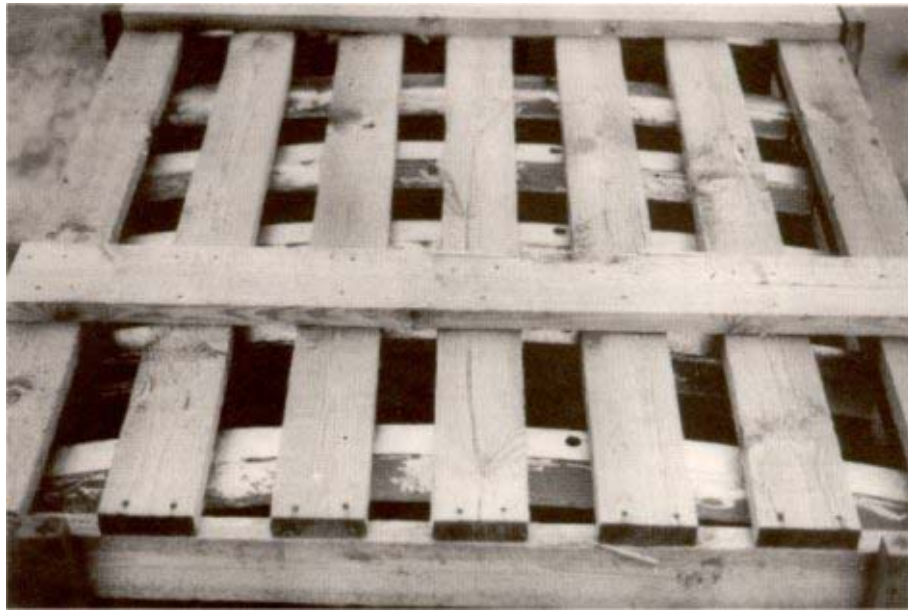
Mass of crates.

The curves show the correlation between tare (kg) for crates and the shipping volume in m^3 , ($l \times b \times h$). In the calculation model $b = h$, and $l = 1.5 \times b$. ("standard type").

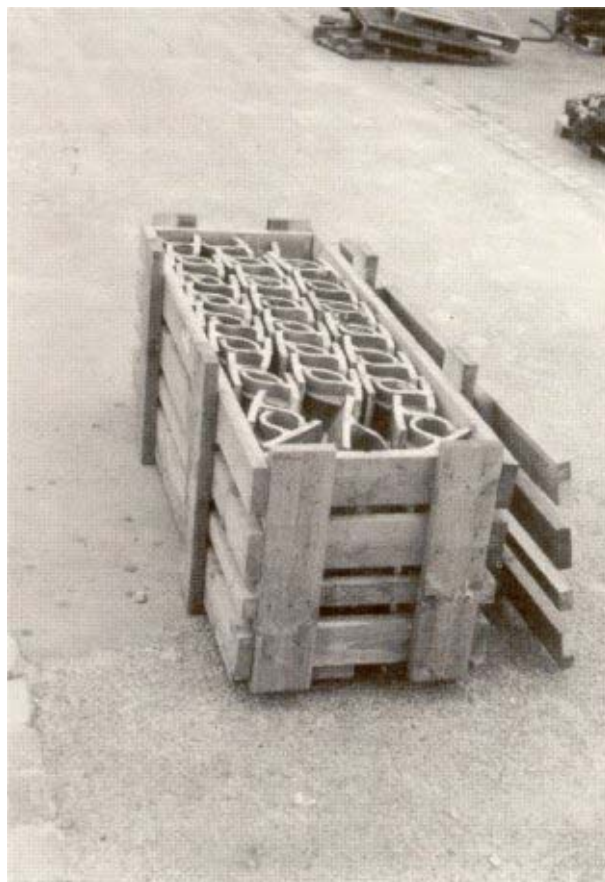
The mass of nails and reinforcing angles for cases of net > 1800 kg has been included in the curves.

The mass of the wood is based on a density of $520 \text{ kg}/m^3$ which applies to standard dry pine.



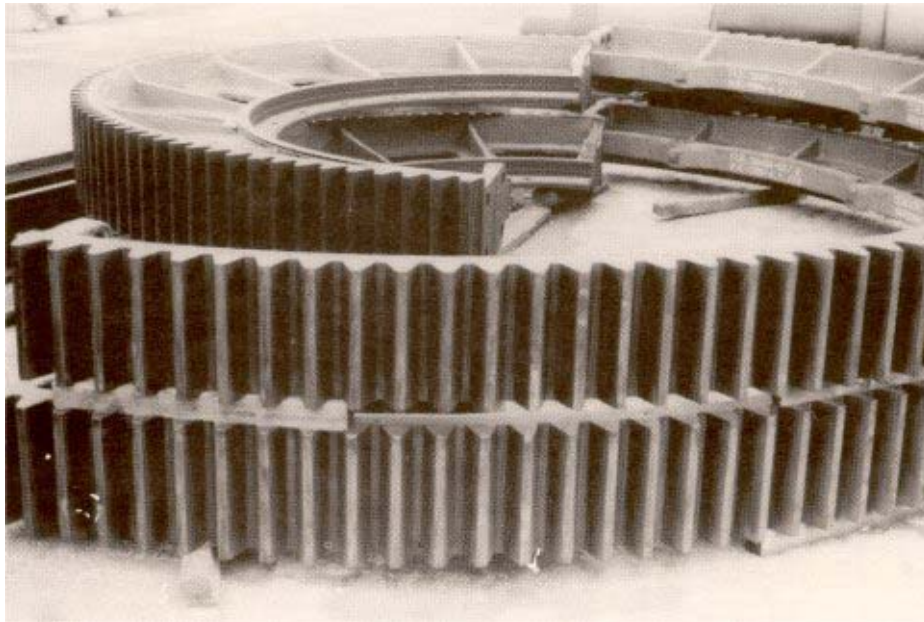


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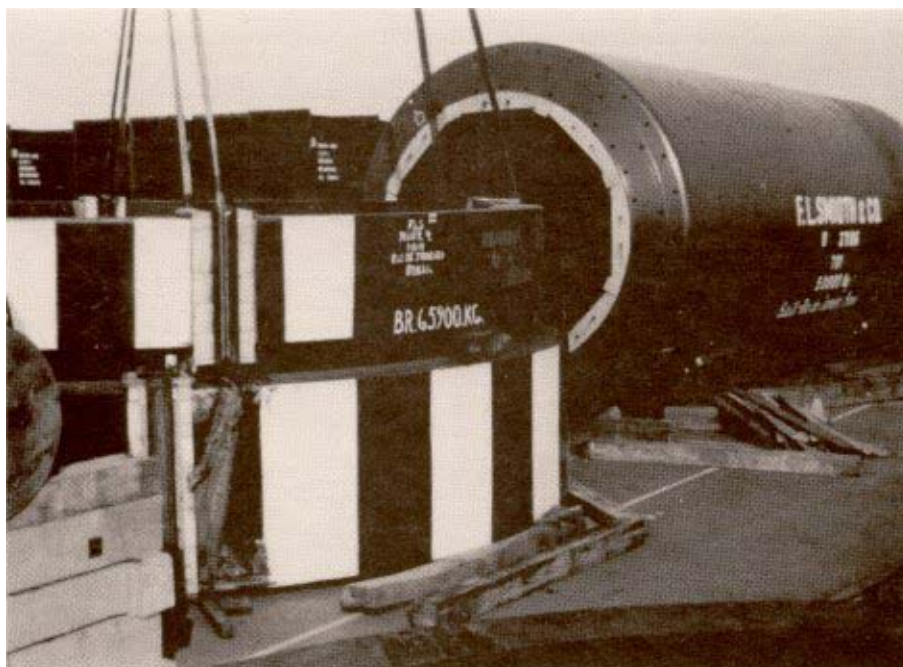


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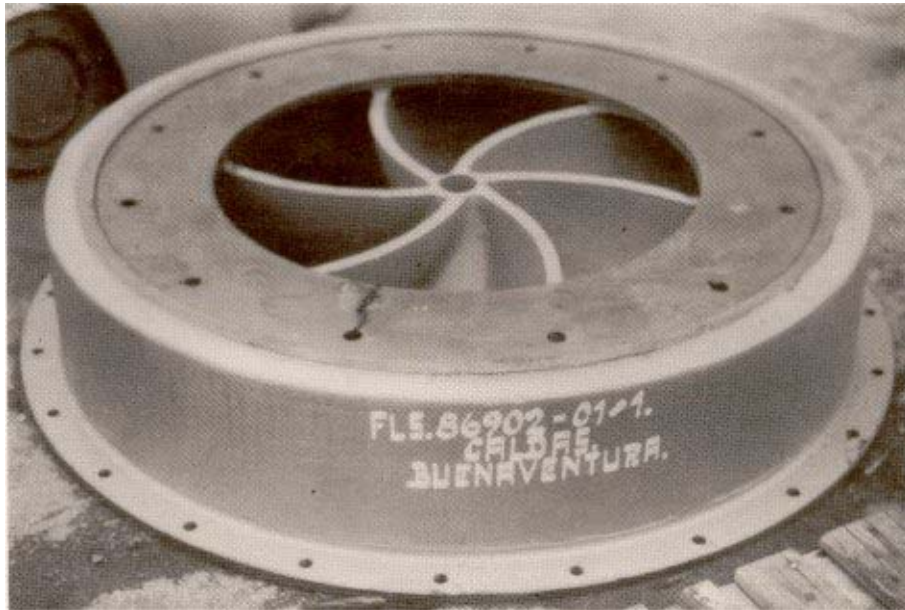


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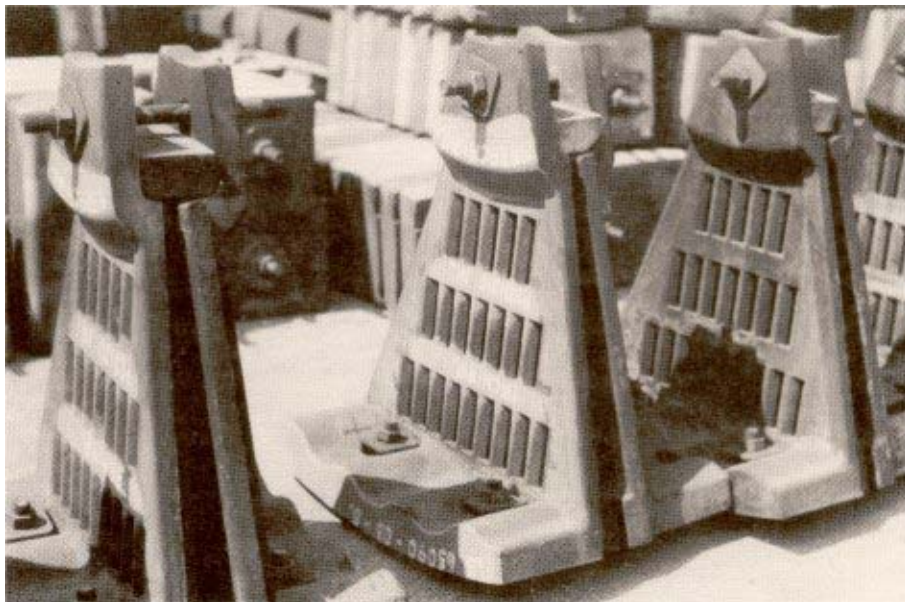


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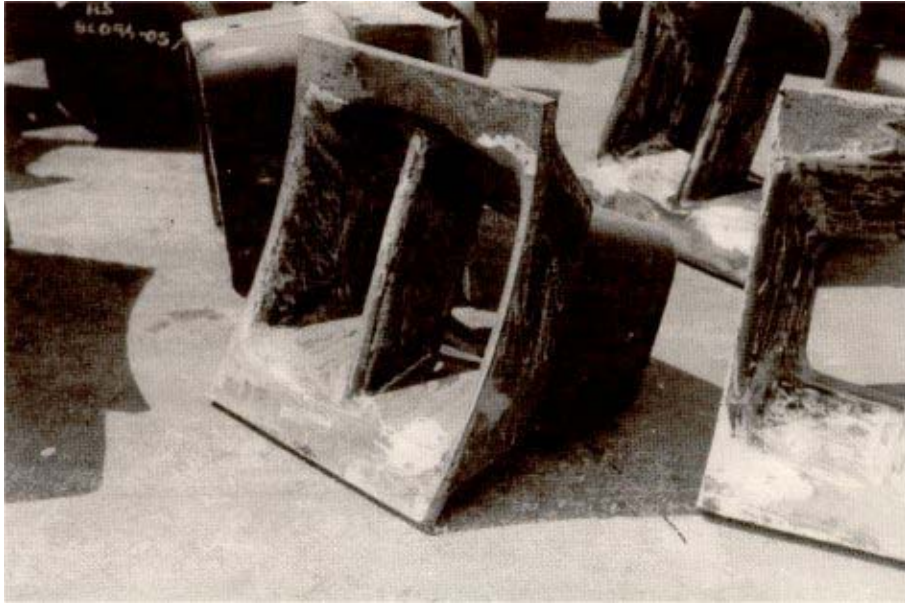


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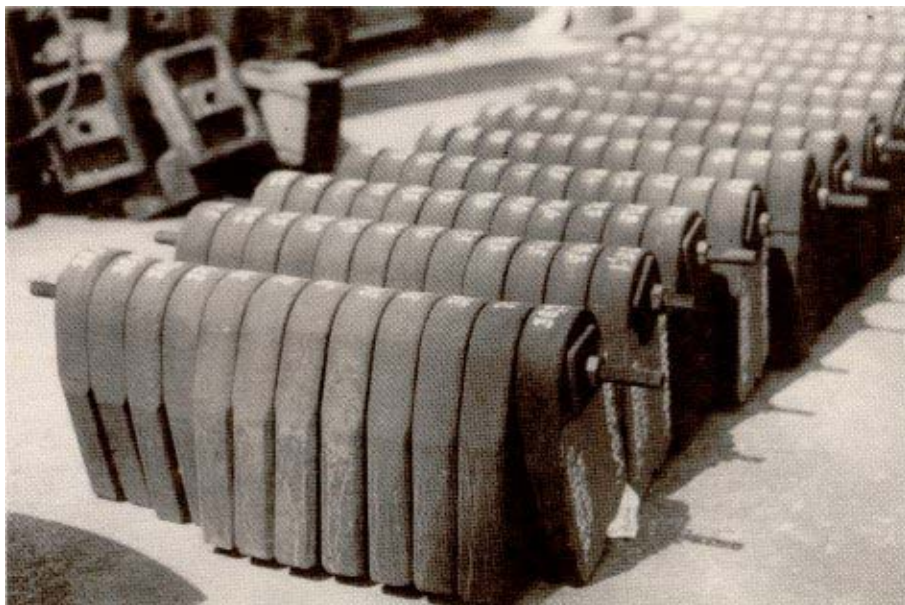


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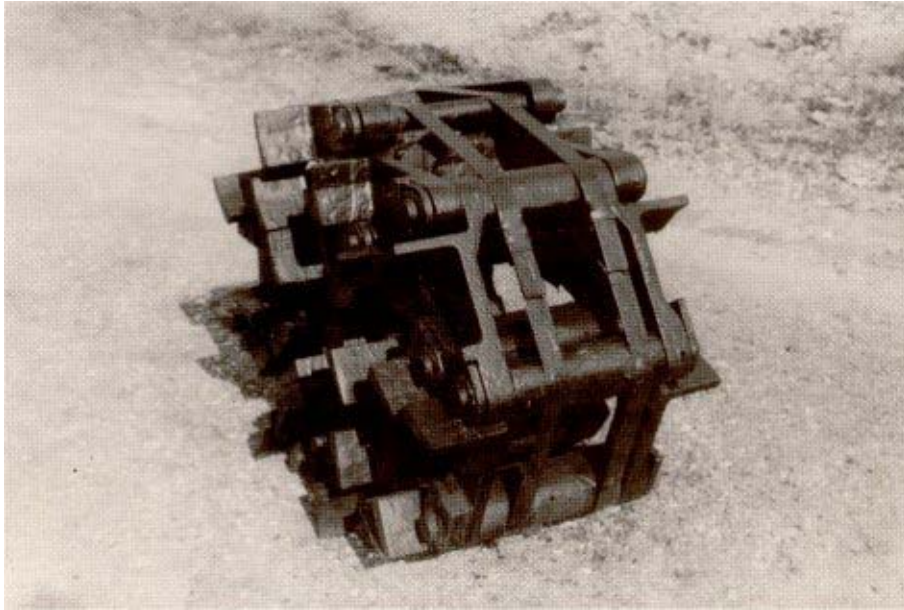


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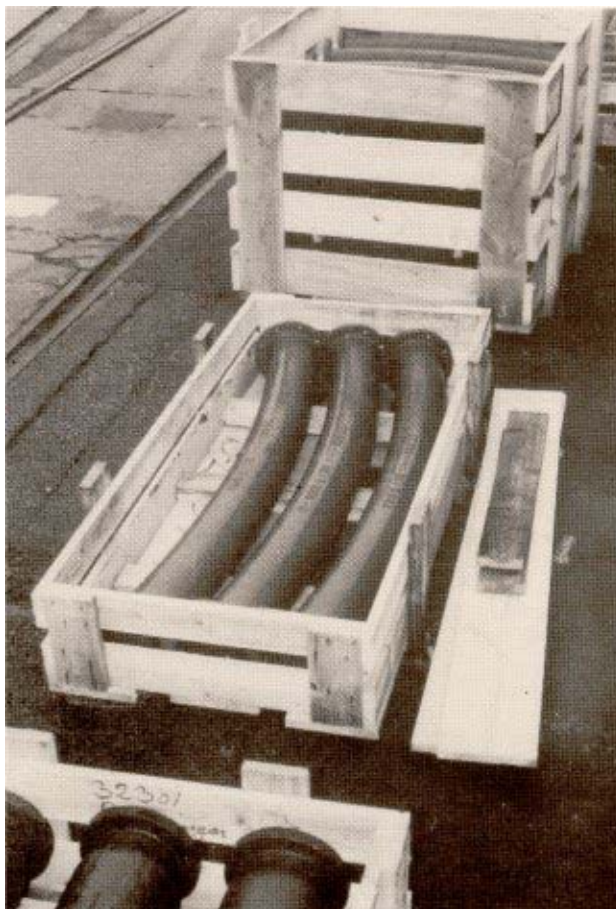


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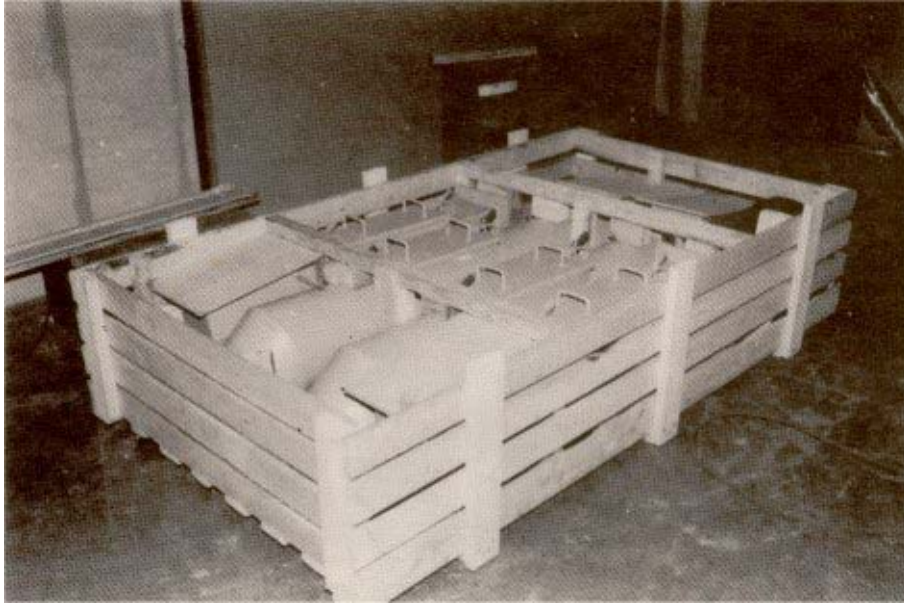


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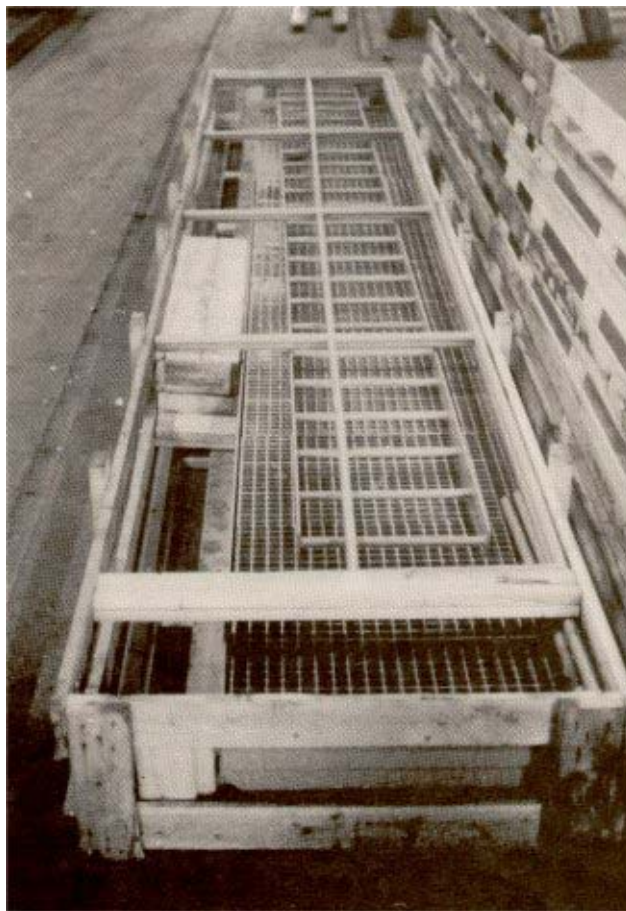


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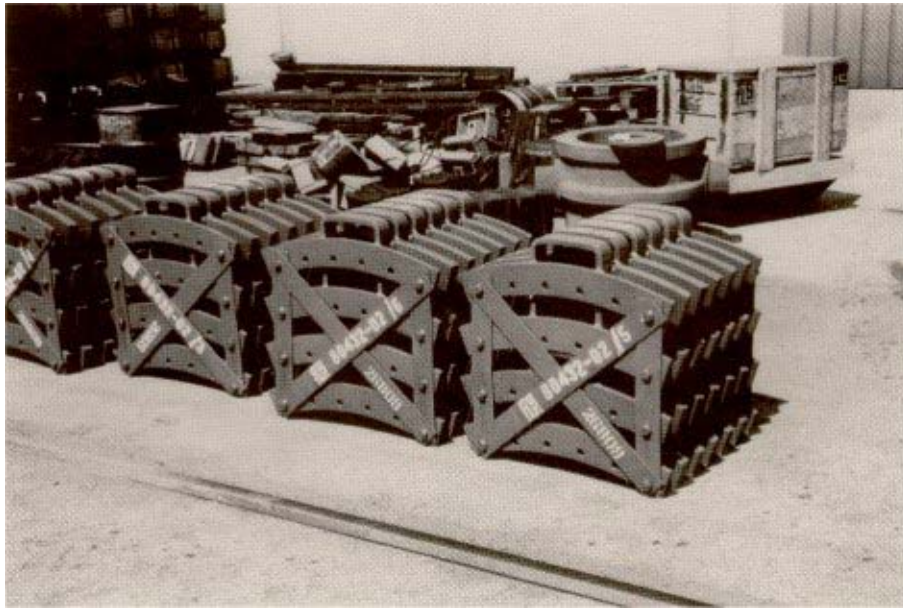


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12

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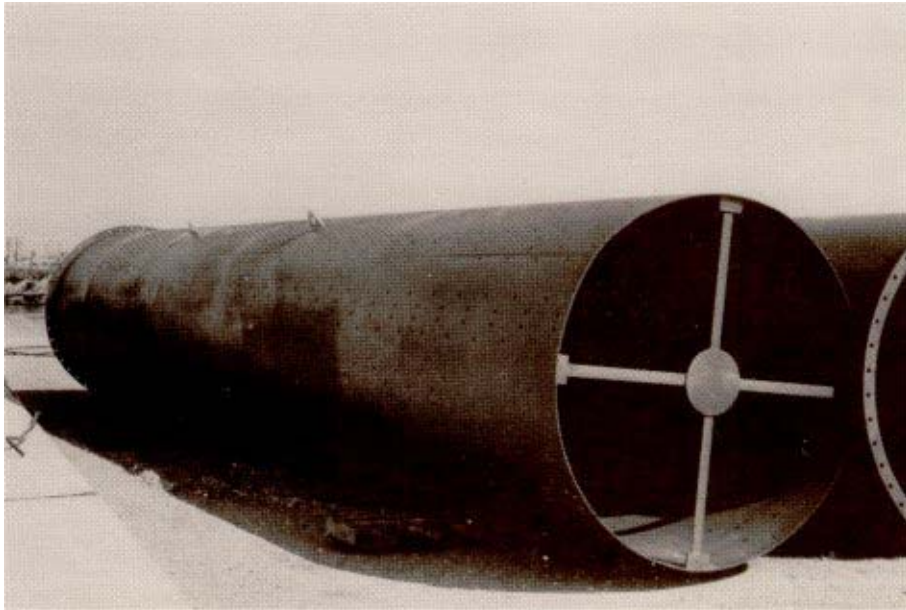


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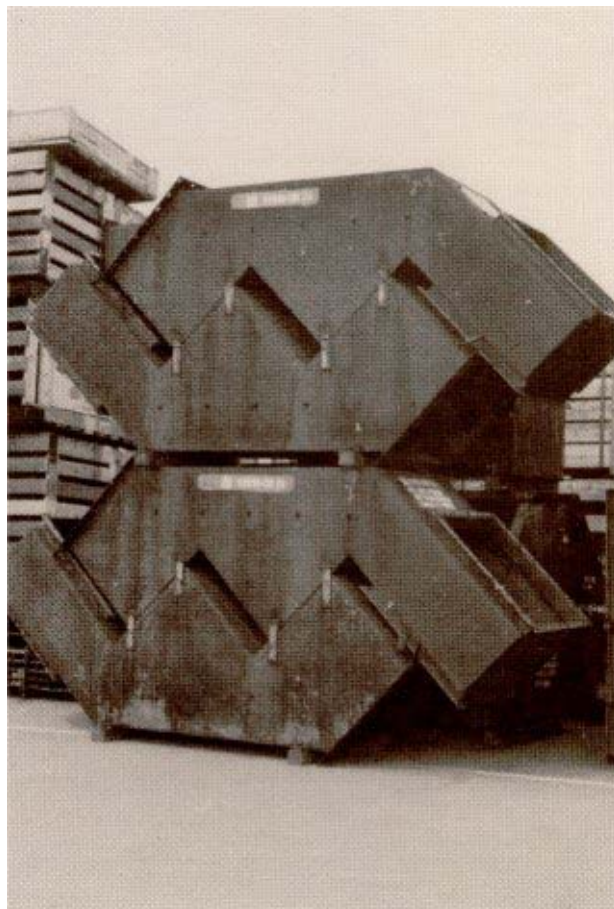


14

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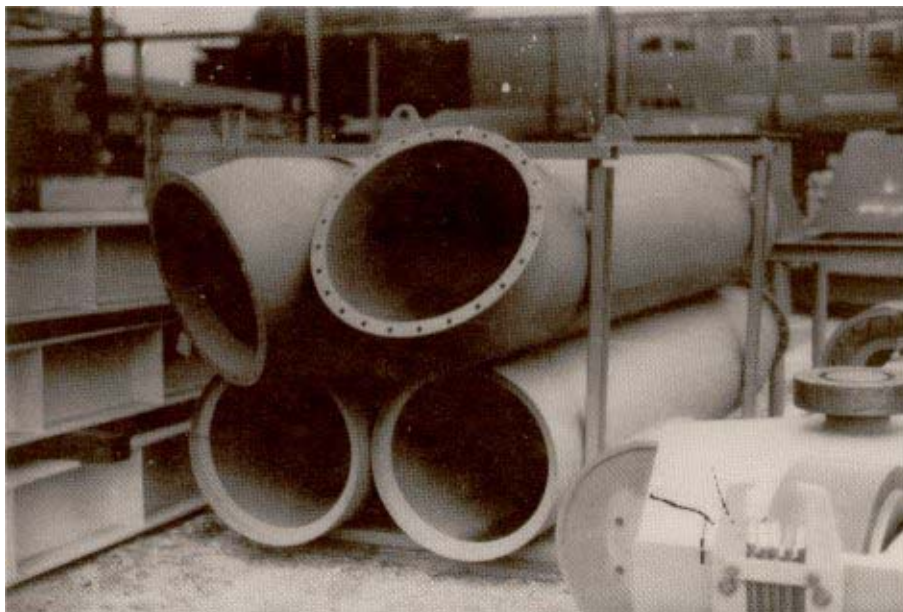


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16

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17

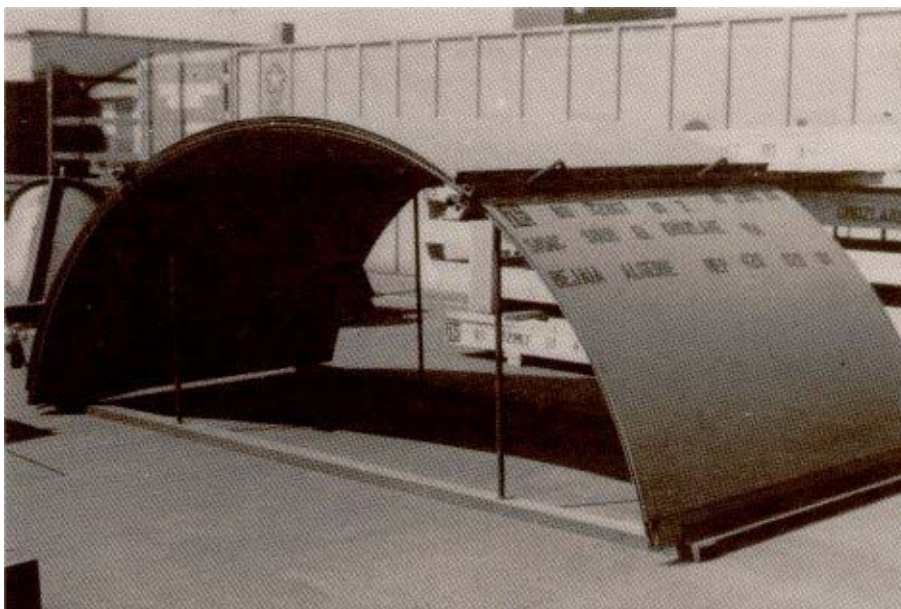


18

12950-07-XIII

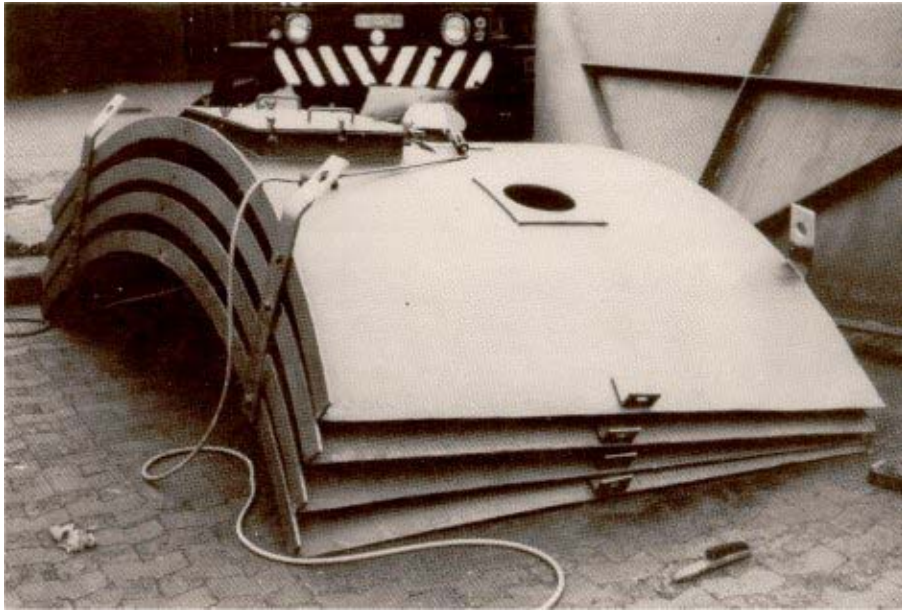


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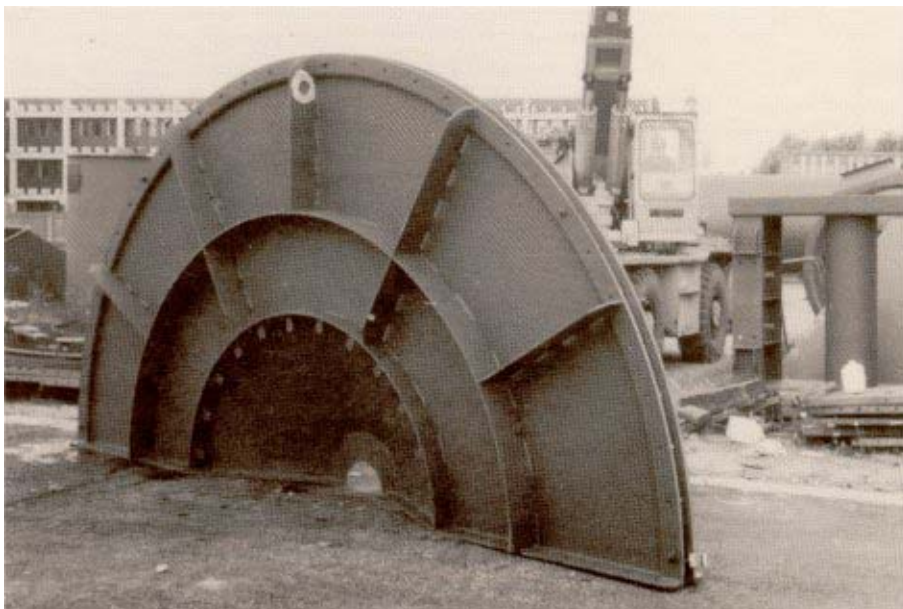


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12950-07-XIV

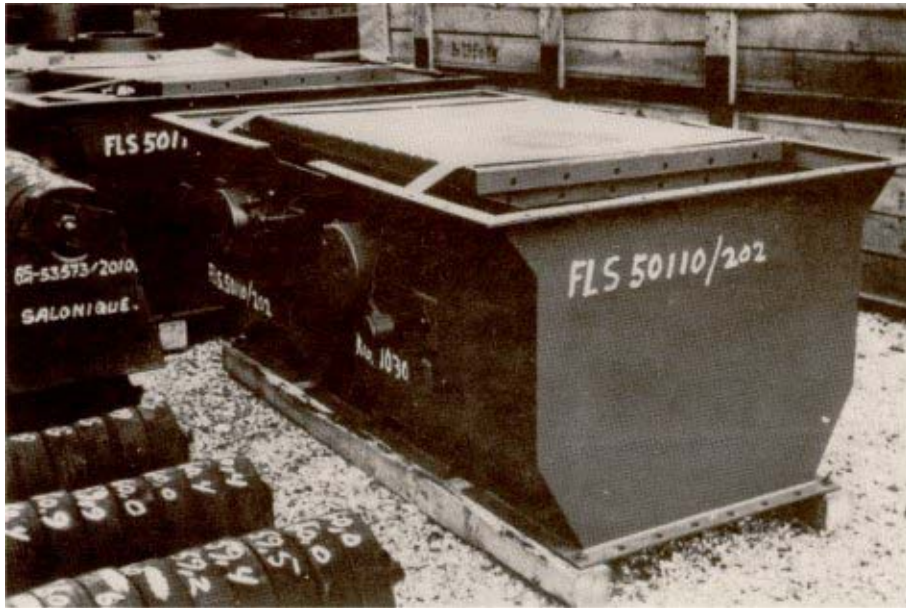


21



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12950-07-XV



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12950-07-XVI

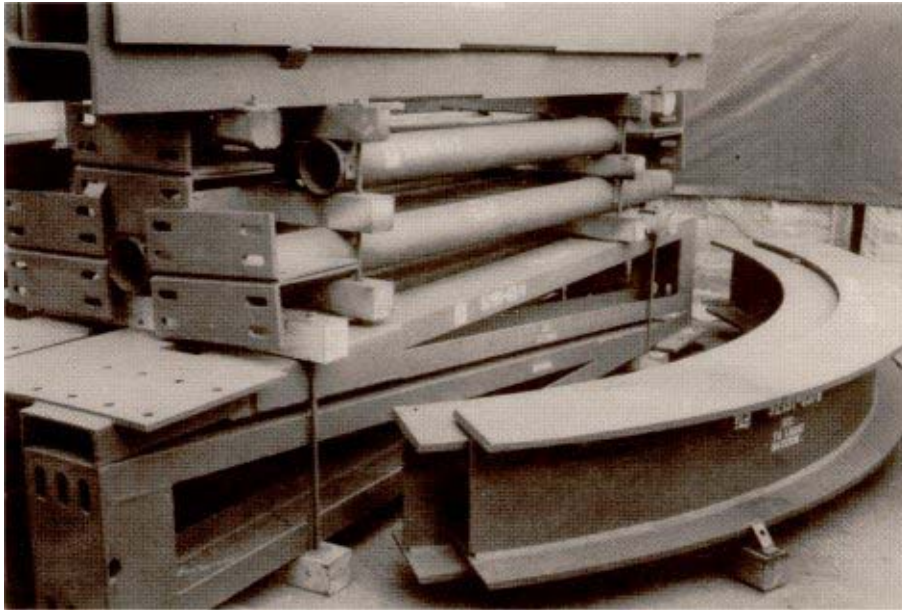


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12950-07-XVII



27

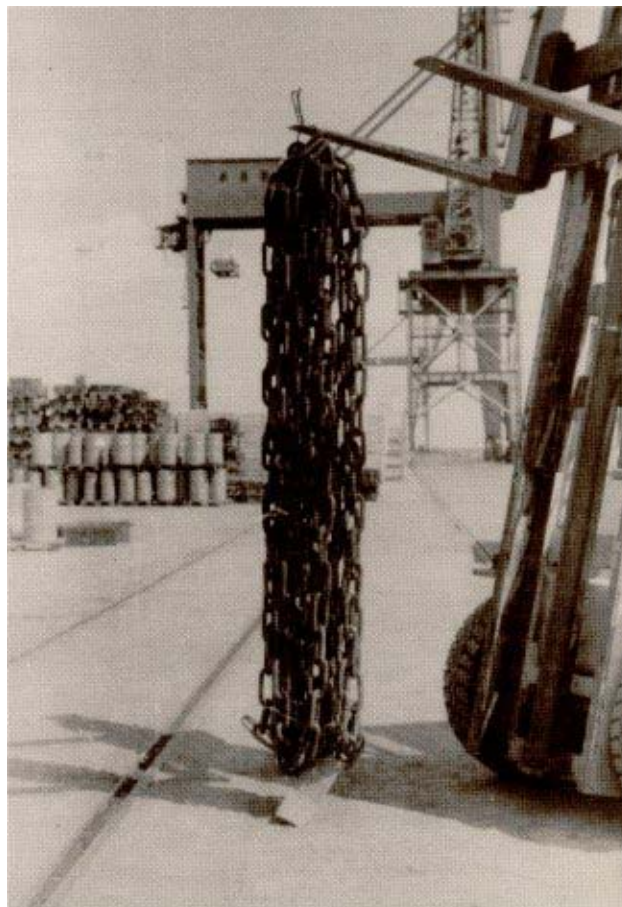


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12950-07-XVIII

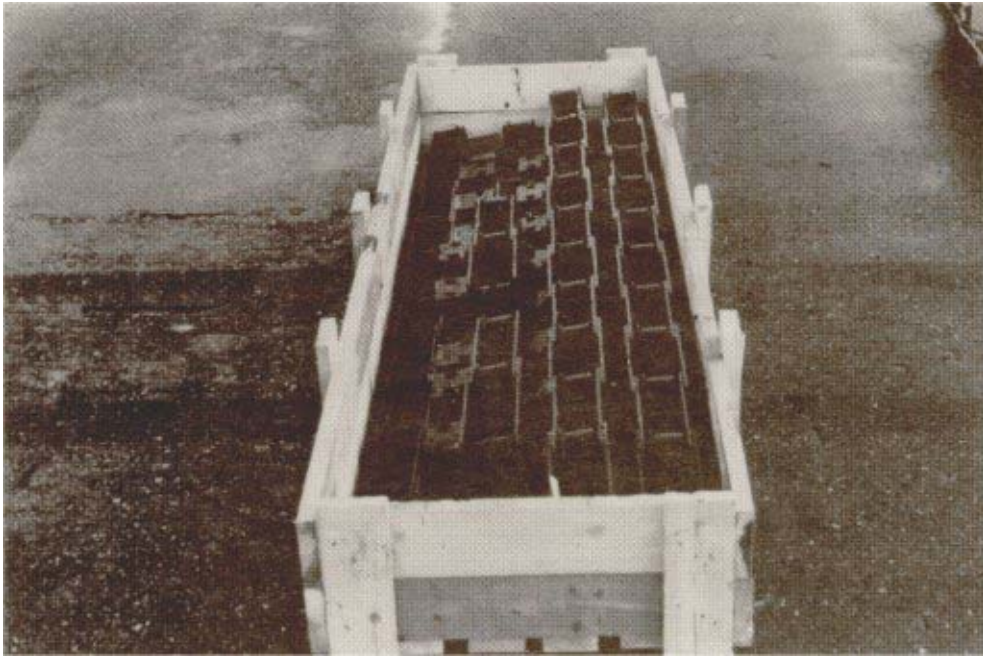


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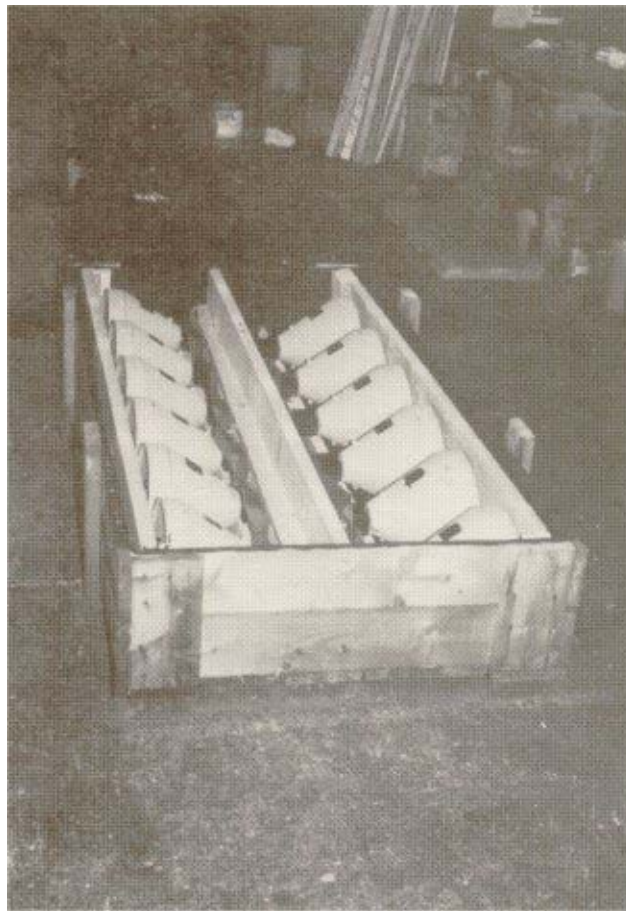


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12950-07-XIX

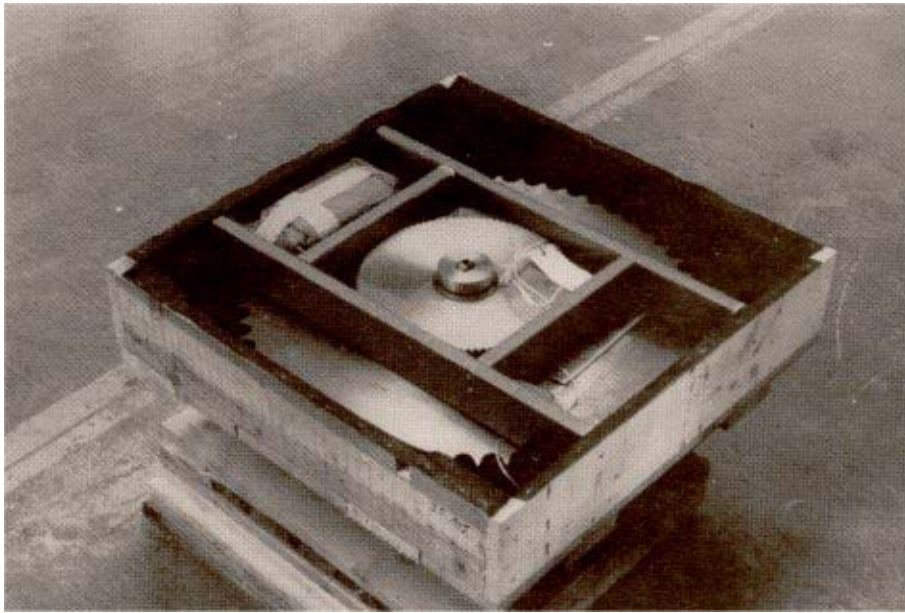


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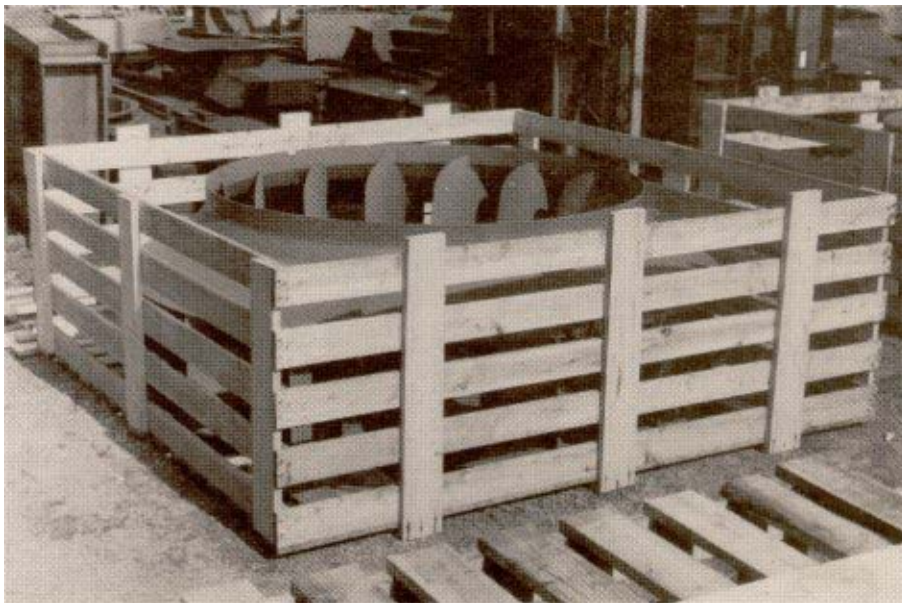


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12950-07-XX

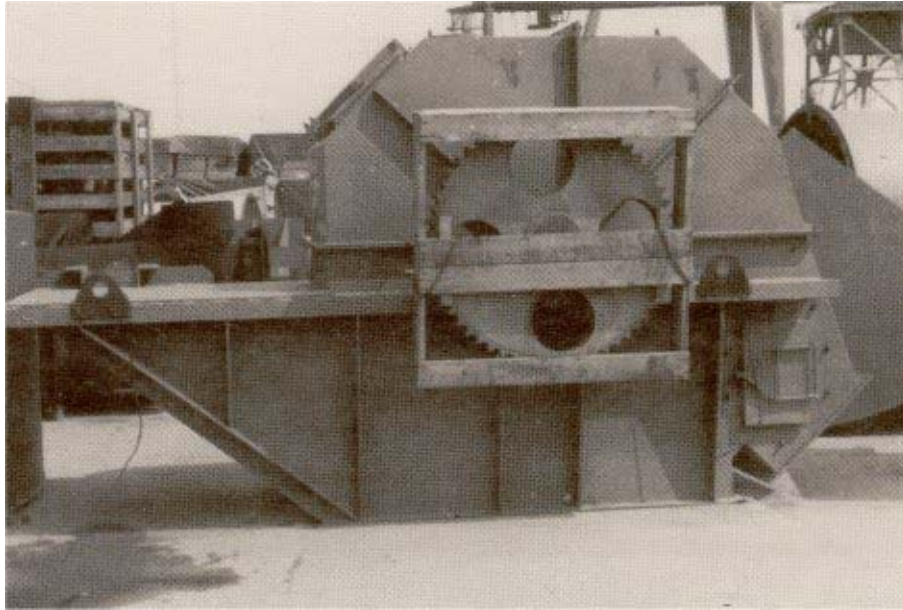


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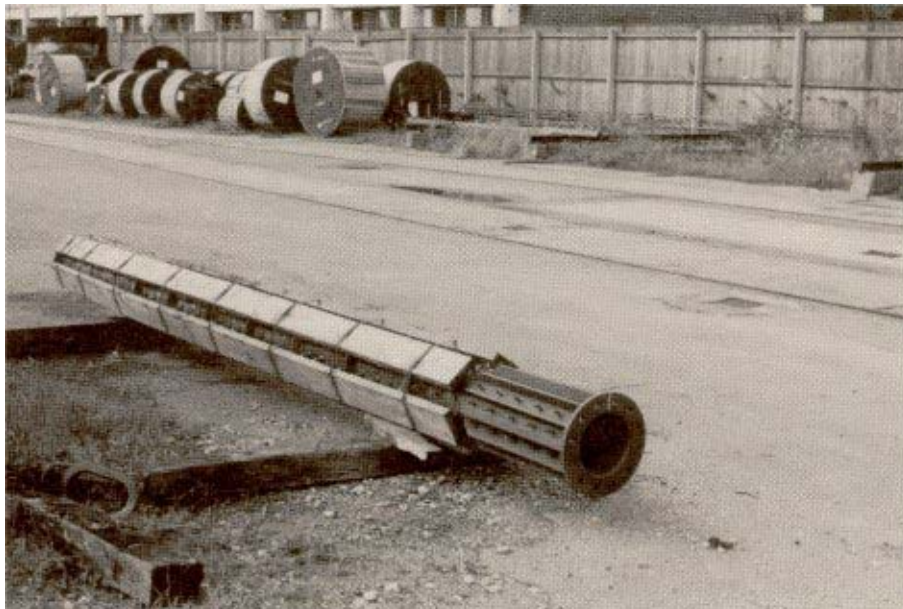


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12950-07-XXI



35

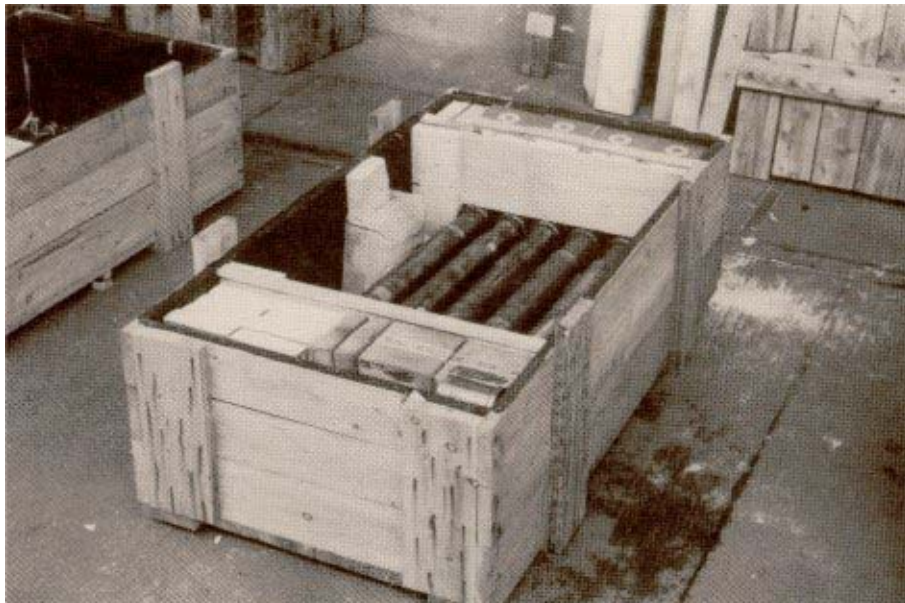


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12950-07-XXII

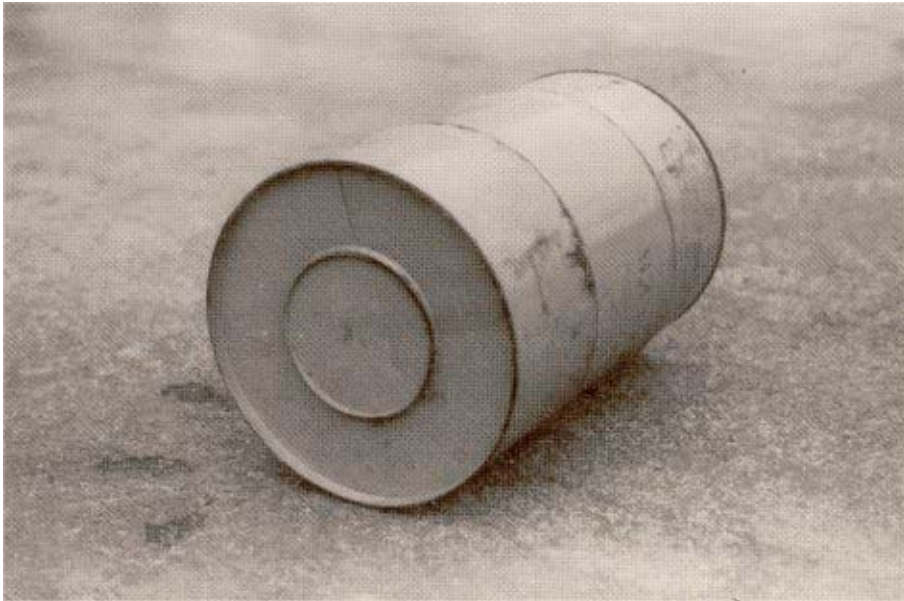


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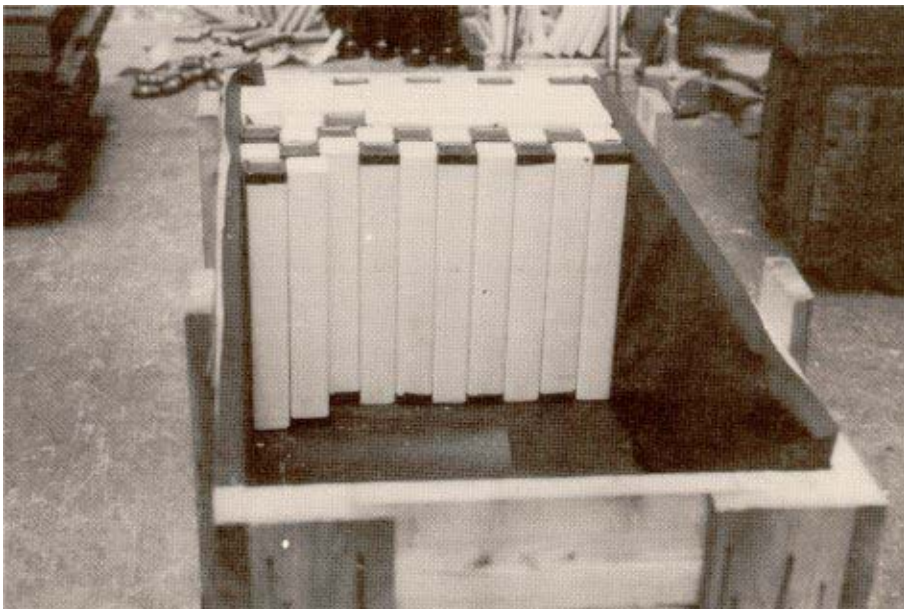


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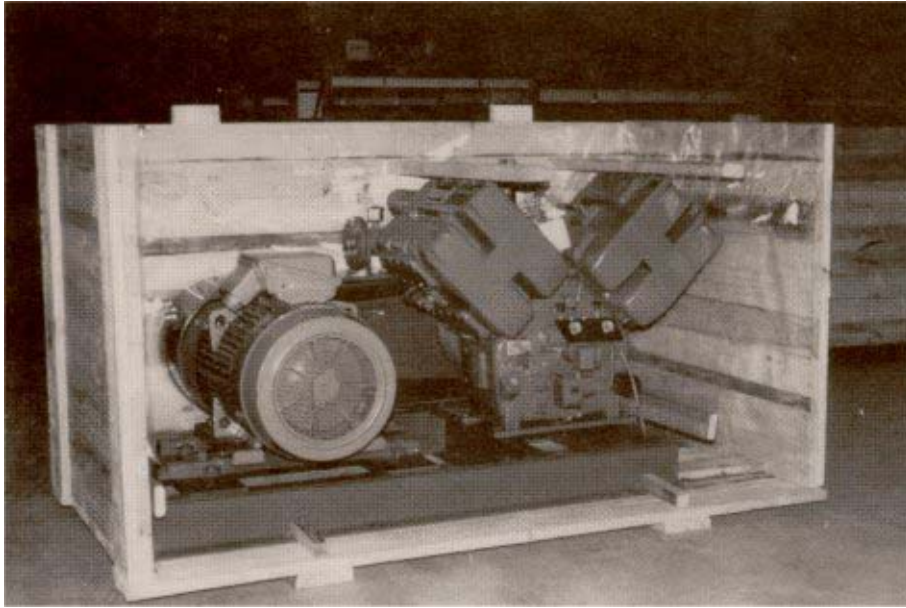


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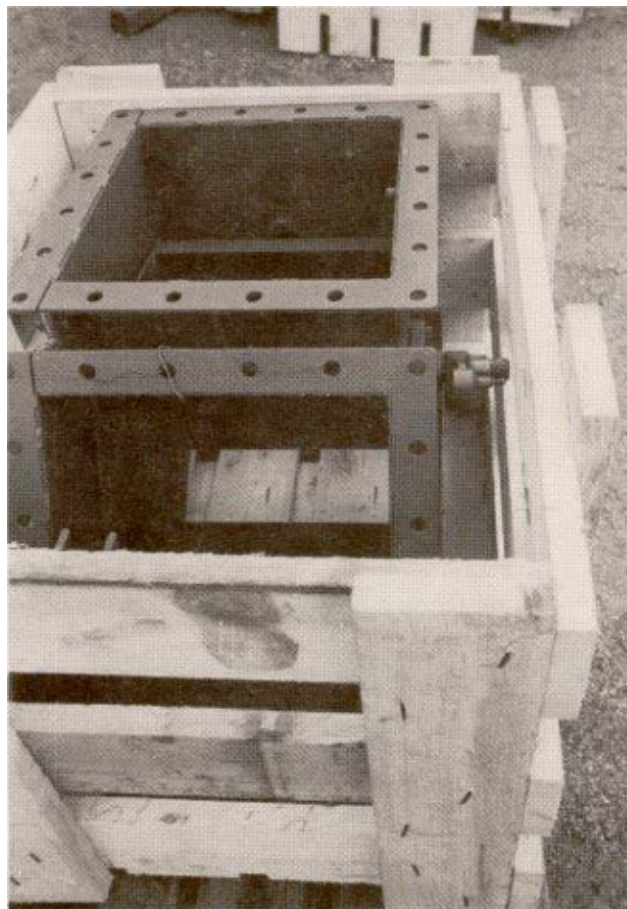


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12950-07-XXIV

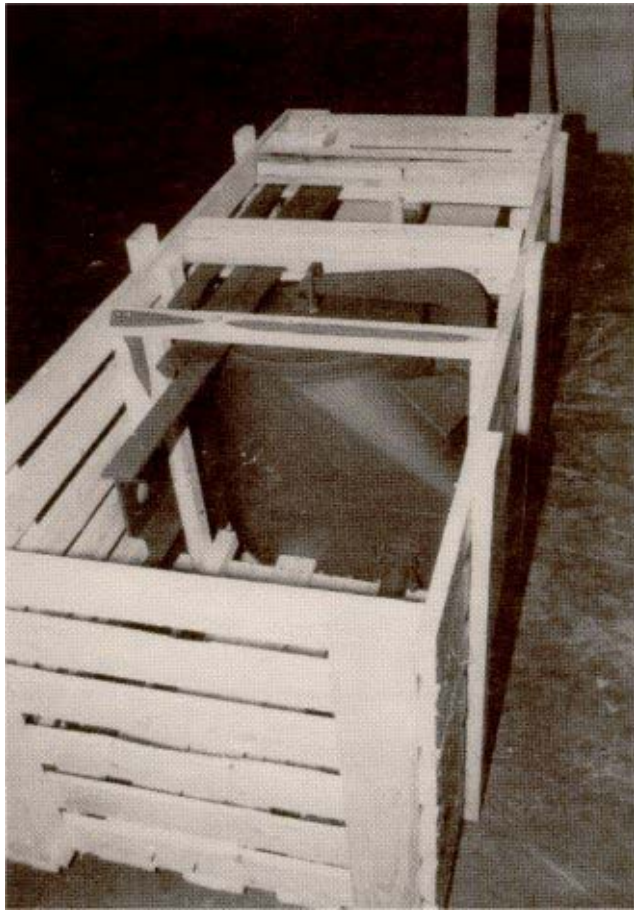


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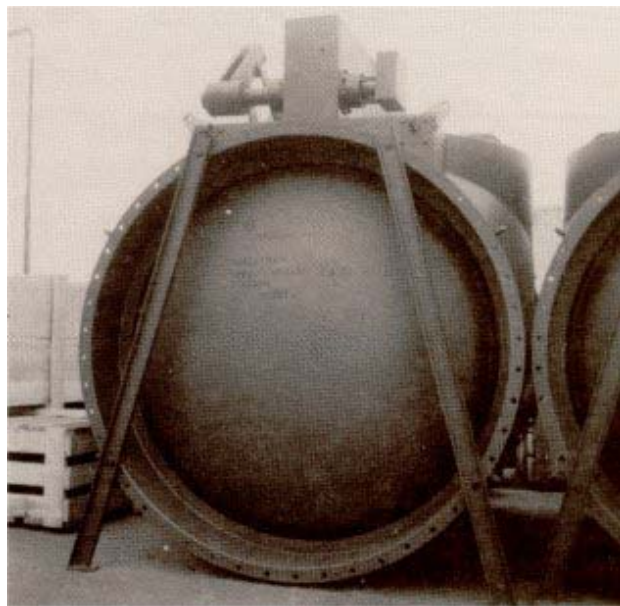


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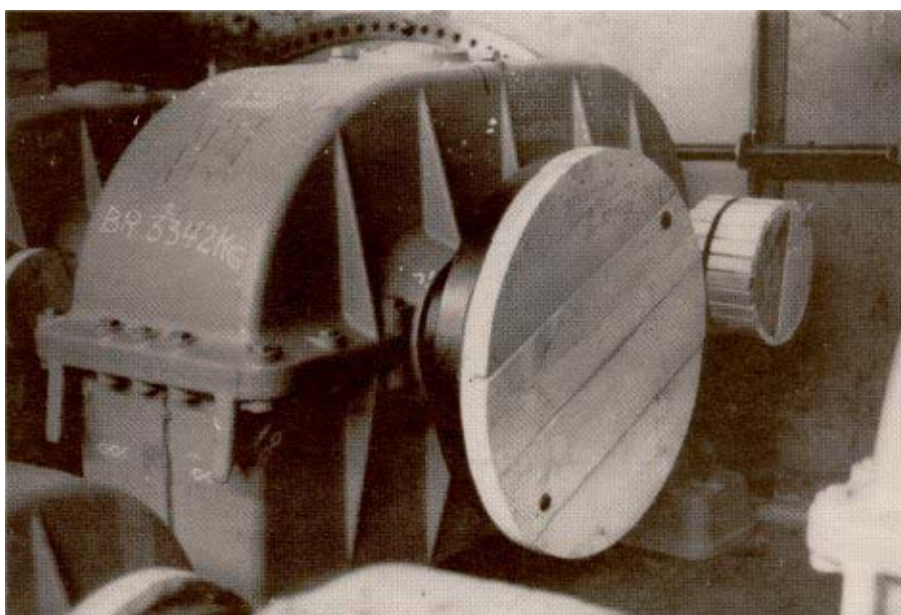


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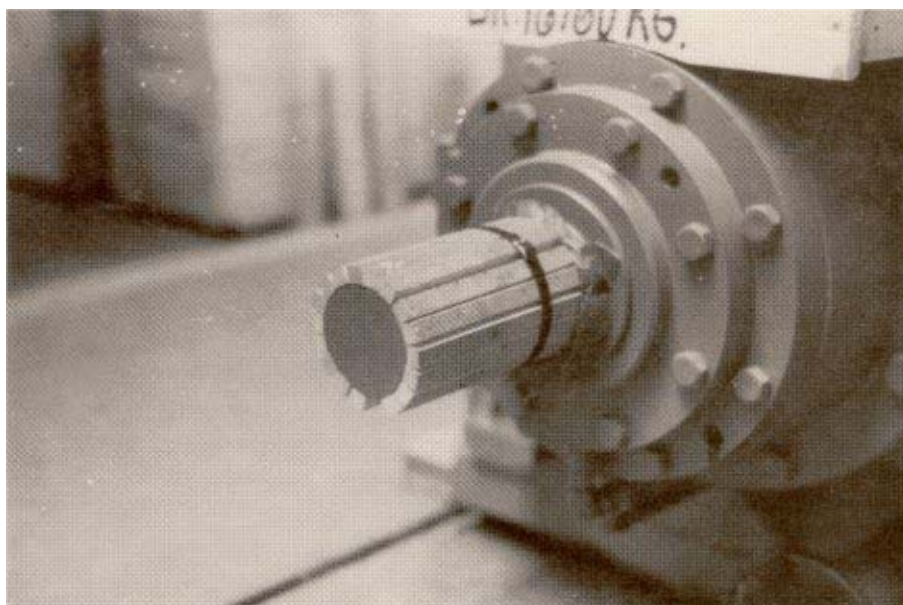


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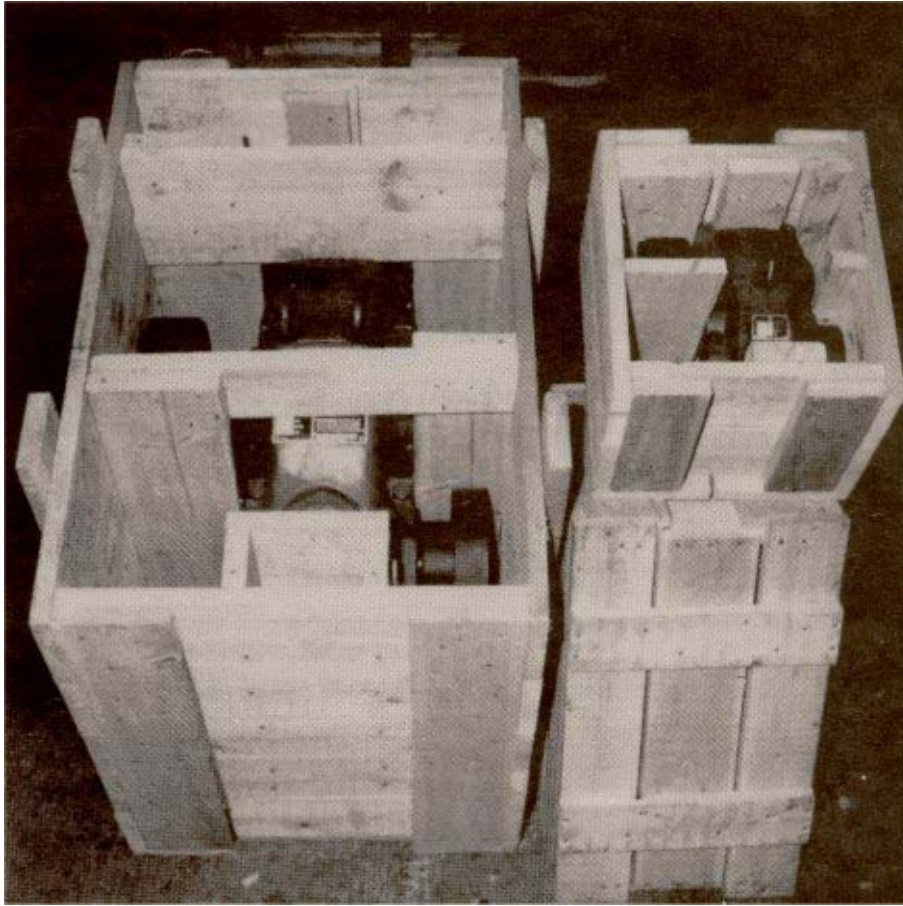


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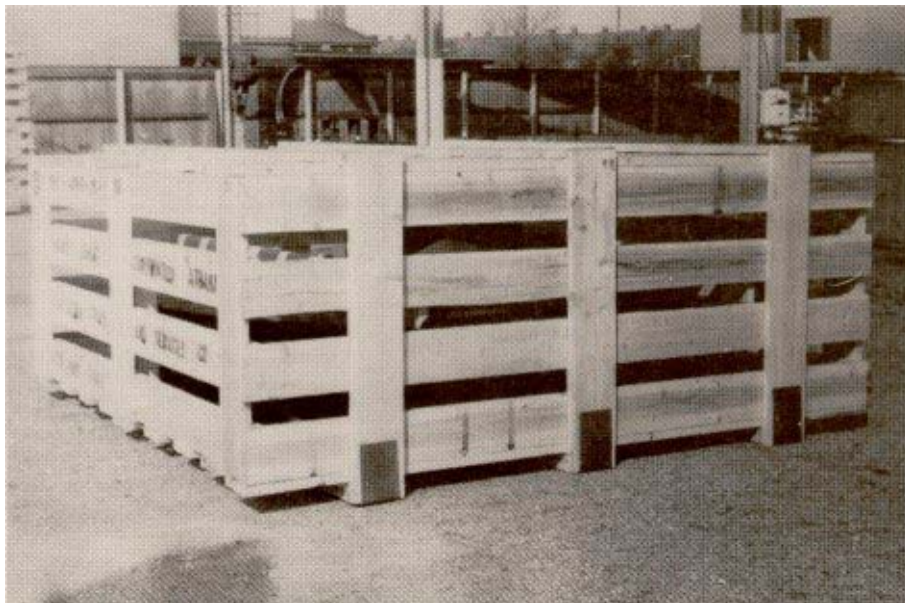


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