



# **M.V. 'CRAFTSMAN'**

**THOS. & JAS. HARRISON LTD.**

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# shipbuilding & engineering

## 500-ton lift capacity on new Harrison liner

ASK ANY SEAMAN what Thos. & Jas. Harrison of Liverpool means to him and after an initial remark about the funnel colours—"two of fat and one of lean"—he is certain to comment on the cargo gear. There is good reason for this reputation, and all the vessels in the Harrison Line fleet are notable for their comprehensive and heavy lifting equipment, while it can safely be said that both ashore and afloat the company contains the greatest amount of heavy lift expertise to be found within the U.K. With its services chiefly confined to the Caribbean, Gulf and Central America, South and East Africa and the Red Sea, the company has managed to avoid the convulsions of containerisation, instead strengthening its heavy lift carrying ability in conjunction with its normal break-bulk services. Harrison Line is by no means eschewing the benefits of unitisation and as the sole U.K. member of the Unit Load Council is playing an important part in the education of shippers in the substantial savings that may be

made in this particular direction. Harrison Line became the first U.K. company to fit the now well-known Stülcken heavy lift derrick with the 180-ton fork type mast installed on the *Adventurer* in 1960. Since that date no fewer than seven vessels have been fitted with derricks of over 100-ton capacity, notable among these being the 150-ton fork type derrick on the 1964-built *Inventor* and the double pendulum unit of similar capacity on the *Magician* and *Historian*, both built by Doxford & Sunderland in 1968.

Latest of these vessels, now on her maiden voyage to South and East Africa, represents a considerable step forward for the company. Built, like many of her predecessors at the Wear-side yards of Doxford & Sunderland and equipped with two 250-ton double pendulum Stülcken derricks from Blohm + Voss capable of a 500-ton load between them, *Craftsman* is the biggest heavy lift ship under British registry and is only exceeded by the 550-ton lift that can be handled by the

This Aeromarine photo shows *Craftsman* en route to pick up a 280-ton lift on her maiden voyage



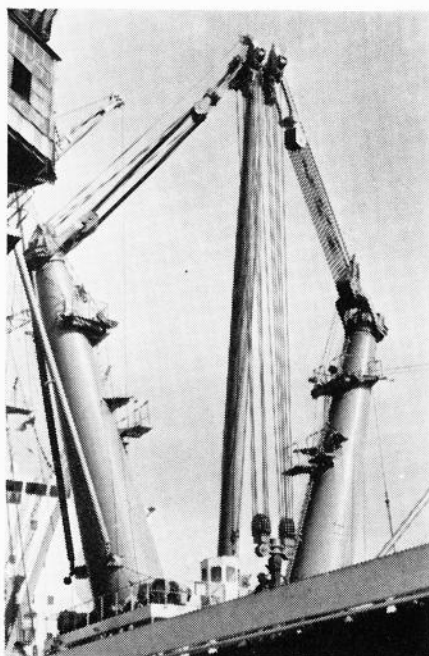
Test load of 550 tons on the two Stülcken derricks. The list is not excessive

Hansa Line cargo liner *Uhenfels*.

Justification for this massive heavy lift capacity being placed on a single ship comes from an enormous increase in the variety and volume of heavy indivisible loads being carried by sea. Manufacturers of transformers, stators and other electrical equipment, chemical and refinery plant are making much larger and more powerful machinery and finding themselves increasingly willing to pay for its shipment to destination in one piece. The 1970 report of the working party on the movement of heavy indivisible loads noted that the trend in size and weight of plant is consistently upwards and that already (in 1970) there was a substantial number of lifts to be exported from the U.K. that would exceed any available port craneage. This trend is, of course, worldwide and it is notable that Harrison Line is quite prepared to operate their new ship outside its normal trade routes, should suitable heavy cargo be offering.

*Craftsman*, No. 900 from the Deptford yard, is a 12 800 dwt vessel of raised quarterdeck configuration with five holds, four of which are forward of the bridge front. There are two 'tweendecks in Nos. 1 and 2 holds, served by a common hatchway, and also No. 5 hold, Nos. 3 and 4 having a single 'tweendeck. With a heavy lift

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Left: the after 250-ton derrick in its stowed position, but ready to work No. 3 hold. Should the derrick be required at No. 4 hold the traverse on the flemish hook is disconnected and the derrick is swung aft allowing half the cargo purchase to pass either side of the boom. Two stowage positions for the conventional derrick booms may be seen on the Stülcken masts.



Right: a detail of one of the derricks swung overside clearly shows arrangements at post swivel and at derrick head. The uppermost wire leaving the post head is the purchase, which passes around the rollers on the derrick head

ship there is clearly something of a conflict to be resolved between the requirements for large open hatches and the need for clear space on deck for long loads of the pressure vessel type. The largest hatches on *Craftsman* are 35ft wide which might be construed as a reasonable compromise. There is a clear length of over 67ft through the vessel's largest hatchway, that of No. 3 hold, No. 4 hold having a 60ft 9in  $\times$  35ft access. Both these holds are capable of heavy reinforcement with portable pillars in 'tweendeck and lower hold when heavy lifts are carried, there being massive reinforcement in way of hatchside girders to cope with heavy deck loads.

### Special cargo spaces

Special cargo lockup space is available in eight 'tweendeck lockers around the "roots" of the forward Stülcken posts, which like their after counterparts are welded strongly to their mast-house top, where they pierce the weatherdeck, and at 'tweendeck level. A further two lockers are available in the poop space. Approximately 20 000ft<sup>3</sup> of refrigerated space is available in five chambers, three in the poop space and two across the forward end of No. 5 'tweendeck.

*Craftsman* is a fast, fine lined vessel and one of the principal problems involved in her design was to ensure her 500-ton lifting capability in all condi-

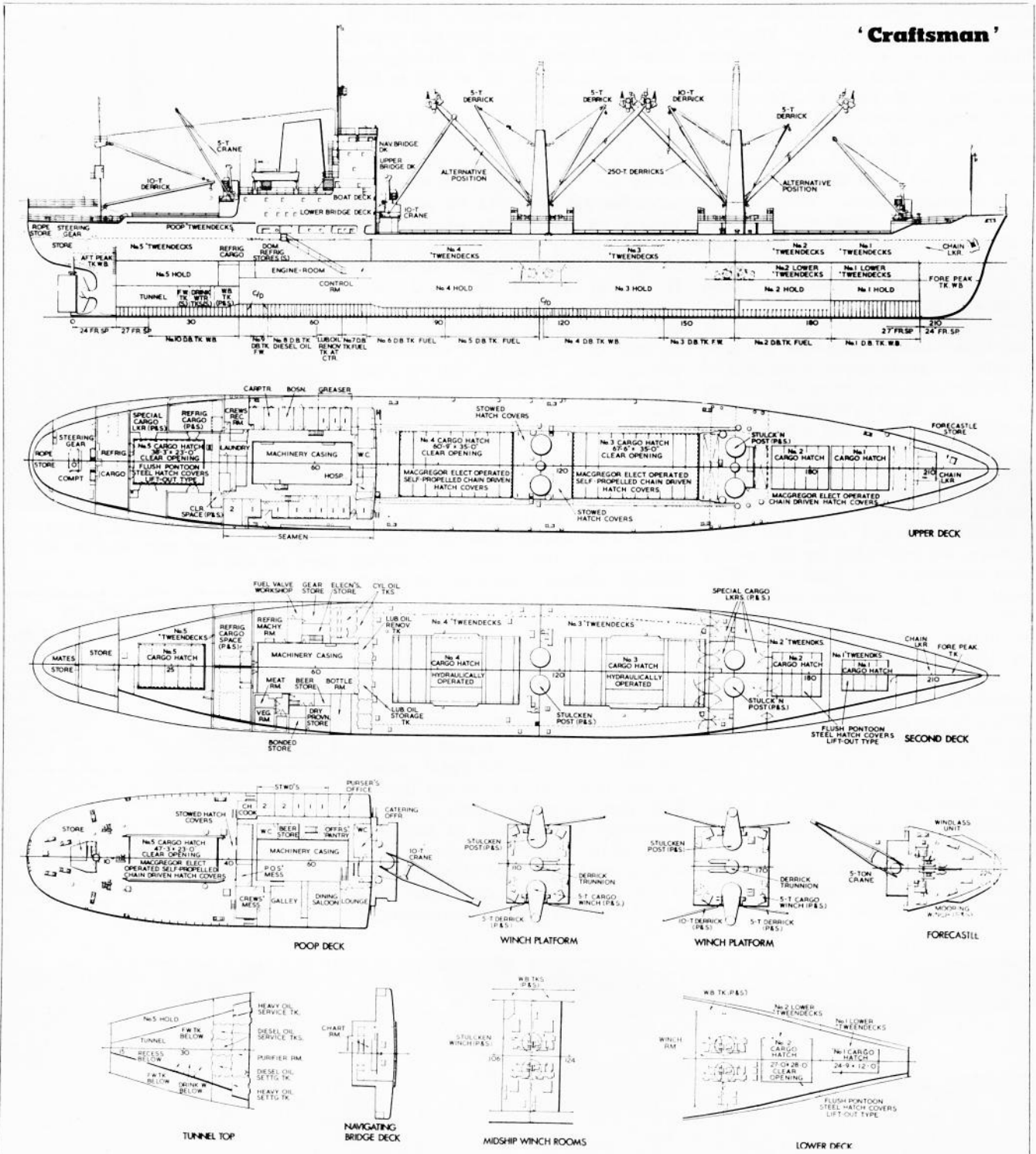
tions without solid ballast. Water ballast capacity is therefore considerable and consists of forepeak, a deep double bottom in No. 1 hold, No. 4 double bottoms, the double bottom under No. 5 hold and the after peak. In addition to this, No. 3 and 4 holds each have a "double skin" formed by an upper and lower wing tank, which comprise the bulk of the ship's heeling compensation when handling lifts. Ballast is handled by two Hamworthy pumps each capable of moving 850 tons/hr, valves being remotely controlled at a single station in the engine-room by a Thrige Naskov system.

The two Stülcken derricks are of the double pendulum type, the design which has replaced the fork type as the heaviest in the B + V Stülcken range. In this type the cargo tackle is suspended on either side of the boom head. Whereas with the superseded fork type the two cargo blocks were hauled over the top of the boom when moving from hatch to hatch, with the double pendulum type the crossbar joining the lower cargo blocks is merely disconnected, enabling the cargo tackles to automatically swing from forward to aft hatch. This type has the added advantage of a possibly doubled hook

speed only using half the cargo tackle with lighter loads, the remaining half of the tackle being fastened to the boom.

### Derrick rigging

Both cargo tackles and the two span tackles are made up of 39mm diameter Seale-compound 6  $\times$  55 wire rope with a 108-ton breaking load, 590m for the cargo tackle, 580m on each span tackles. Actual rigging of these massive derricks is deceptively simple, a single wire coming up each Stülcken post from the span winches, rove around the span blocks and fastened at a thimble at the post head. Wire from the port cargo winch runs up the port post, across the guide roller on the pendulum block fitting and around the five sheaves on the port cargo block. It then passes across the head of the post on another guide sheave, around the starboard tackle and via a guide sheave to the starboard post head, thence proceeding straight to the starboard cargo winch. The winches are situated in a compartment at approximately lower 'tweendeck level, giving obvious stability benefits over alternative arrangements seen with this rig that have involved winches mounted high on the deckhouse or in the posts



**PRINCIPAL PARTICULARS**

Length o.a.	532ft	Depth, moulded to 2nd deck	30ft 2in	Bale capacity	582 336 cu ft
Length b.p.	495ft	Gross register	10 219 tons	Refrigerator capacity	21 600 cu ft
Breadth, moulded	73ft 6in	Nett register	5 169 tons	Block coefficient	0.61
Depth, moulded to upper deck	41ft	Deadweight	12 830 tons	Propulsive power	16 000 bhp
		Draught, summer	30ft 8½in	Service speed	18½ knots

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themselves, where maintenance problems must be considerable. The four 110hp winches of Clarke Chapman manufacture which, together with their associated Ward Leonard gear, serve each derrick are arranged, two beneath each post, in such a way that the ropes without any additional guidance run from the post head directly onto the corresponding drums. Wire stowing gear is however fitted to each drum and the two winch rooms are forced ventilated.

Each derrick is controlled independently by separate operators using two-lever joystick controls worn on their chests and allowing them complete mobility. It might appear something of a disadvantage not being able to see the winches when operating, but each masthouse has on its side a small panel to give warning of crossed turns or a rope unevenly running, in which case the operating winches will automatically cut out.

Operations, when using the heavy derricks, are controlled by the master from the wheelhouse, aided by a clinometer and a set of Malone tank gauges. From this position he is able to direct the derrick operator on the foredeck and also is in constant communication with the engineer at the ballast pump controls in the engineroom. A lift, of maximum size and weight, can be taken aboard or landed within the hour in this manner. It has been found that with the maximum load on the maximum outreach from the quay edge, ballasting is such that the list does not exceed 12½%.

The derricks are of course accompanied by greatly strengthened MacGregor steel weather and 'tweendeck

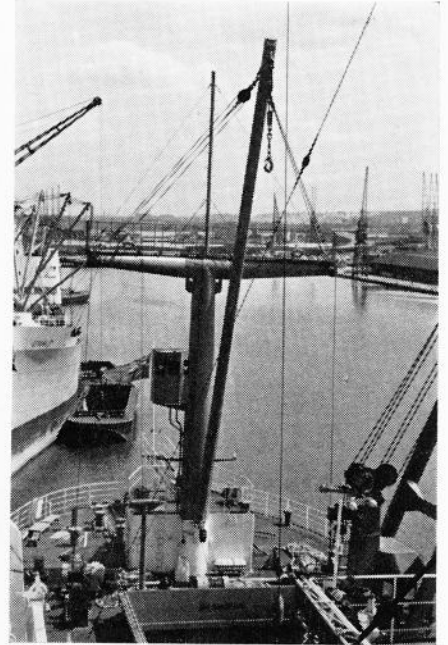
hatches, massive coaming to spread the weight of large deck loads and a profusion of lashing points, including lugs inset on the outside of the hull to lash loads of excessive width.

Maintenance of the heavy lift equipment is made relatively easy by the provision of separate winch room and the swivel bearings at the post heads are accessible for inspection by permanent ladders on the outside of the posts.

*Craftsman* is propelled by a single 8RND76 Sulzer engine developing 16 000 hp directly driving a four-bladed Stone Manganese propeller. The not inconsiderable power requirements are met by two 8-cylinder Allen diesels driving two 750kVA 600 rev/min Laurence, Scott & Electromotors enclosed ventilated drip-proof rotating field a.c. generators of brushless, compounded, smooth core rotor design producing 440V 3-phase 60Hz. There are also two 6-cylinder Allen machines.

*Craftsman* represents the Harrison Line's first venture into the field of automation, the company having hitherto adopted a cautious attitude to this. The vessel is bridge controlled via a Sulzer pneumatic electro-synchro unit and machinery has been designed for a 16hr UMS classification. Machinery is monitored by a Scama Pan-alarm system of over 100 points.

The massive derricks of *Craftsman* are likely to prove a highly profitable investment for the Liverpool owner. On her present maiden voyage the two were used in tandem with a 280-ton monobuoy for the port of Bonny in West Africa. There are, after all, few ships around capable of lifting this load in one piece and enquiries from shippers are running well up to expectations.



The simple 10-ton Stülcken derrick crane aft. Its two span winches are used for mooring

### PRINCIPAL PARTICULARS

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Breadth mld.	73ft 6in
Nrt	5 169 tons
Grt	10 219 tons
Dwt	12 830 tons
Summer draught	30ft 8½in
Service speed	18½ knots

Left: 'Tweendeck in No. 3 hold. The vessel is being readied for a heavy deck load and three of the portable pillars may be seen shipped. Below: The reason for it all—a 286-ton single point mooring buoy comes aboard ready for service

