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Davit for Handling Piston Corers

John C. Burke
Woods Hole Oceanographic Institution
Woods Hole, Massachusetts 02543

Most core rigs over 15 feet (5 m) in length are cumbersome, awkward, and in bad weather somewhat dangerous to handle. On all Woods Hole Oceanographic Institution ships, coring is done over the side, using a hydraulically operated A-frame. In recent years, two methods have been used to transfer the core rig from its point of assembly to its ‘down’ position outboard, attached to the lowering cable. With the older method, the rig was assembled on deck, picked up with a crane, swung outboard, and attached to the main wire. With the second method, the rig was assembled outboard aft of the A-frame at rail height on a specially devised trolley; then the trolley was moved forward under the A-frame and the weight was transferred to the main cable, using a chain hoist. Both methods required moving a heavy weight with attached barrels from the point of assembly to a position under the A-frame, where the rig could be suspended on the main cable. In both procedures the elevation of a heavy weight on a cable or chain above the deck on a rolling ship became hazardous to both life and property. The coring davit, a successful device for reducing these problems, has been used on the R/V ATLANTIS II for the past three years.

The coring davit, as shown in Fig. 1, is mounted on deck just forward and outboard of the aft limb of the A-frame. The corer weight-stand, when not in use, is fast to the davit cradle and is swung inboard so that the A-frame is free for dredging or trawling. To assemble the piston corer, the weight-stand on the davit is swung outboard, pointing forward in such a position that barrels can be attached along a line between the forward limb of the A-frame and the rail, inboard. In this position the swivel point of the davit cradle is directly beneath the sheave of the A-frame. Forward of the A-frame, ATLANTIS II has 70 feet (21 m) of open rail; along this, barrel racks are placed at 10-foot (3-m) intervals at the height of the rail. To ease assembly of the corer, the height of the davit was determined by the height of these barrel racks; the coupling on the weight-stand, when horizontal in the cradle, matches the

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height of the barrels on the racks. Thus the piston corer is easily assembled, in the shelter of the rail, while the vessel is underway. When the vessel is hove-to in position to core, 2 inch x 4 inch x 8 feet (5 cm x 10 cm x 244 cm) levers are used to move the barrels outboard; a rope sling with a few turns around a bollard is then slackled off to lower the barrels to the position shown in Fig. 1. The pilot weight or pilot corer is now attached. Not until everything is rigged and the corer weight has been transferred to the trawl wire is the weight-stand released from its firm attachment to the davit cradle and the rig lowered away.

Details of the corer-davit construction are shown in Fig. 2. Working drawings may be obtained by writing to the author at Woods Hole Oceanographic Institution.

The actual height and length of the davit arm are designed to fit the rail
height and center line of the A-frame for a particular ship. Construction of the davit is of 0.5-inch (12.7-mm) mild steel, unless otherwise noted, with all exposed surfaces treated with Dimetcote. The davit constructed for ATLANTIS II (Fig. 2) has a base plate of 4 feet (1.2 m) by 2 feet (0.6 m), which is bolted and welded to the deck in such a position that the weight-stand may be swung outboard directly beneath the sheave on the A-frame. The davit arm is made of 8-inch schedule-80 pipe [7.625 inches (194 mm) ID and 8.625 inches (219 mm) OD]. The arm is T-shaped, with the horizontal member about 3 feet (1 m) long and the vertical member 28 inches (0.711 m) long. The vertical T-member slides into the davit socket, which is a 14-inch (0.355 m) length of heavy-wall steel tubing [ID 8.75 inches (222.5 mm) and OD 9.75 inches (247.5 mm)] welded to the base plate. A ring with a series of holes is welded to the top of the socket. As shown in Fig. 2, a stop is welded to the davit arm just above the ring on the davit socket; a bolt through the stop engages one of the holes in this ring and securely fastens the davit arm in any position. There are no bearings in the socket or on the base plate; bearings were considered, but in actual use it was found that a little grease on the inside of the socket was enough to allow the davit arm to be swung into position with safety. The axle housing is welded to the horizontal end of the davit.

2. Amercoat Corporation, 201 N. Berry Street, Brea, California.
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arm. Gussets are used for strength and stiffening where needed, as shown in Fig. 2. Welded half rings on the cradle end of the arm serve to lash the davit down and to swing it inward with block and tackle. The cradle is 14 inches (0.355 m) wide by 16 inches (0.406 m) long; it is made of 0.375-inch (1-cm) stock and is V-shaped to accommodate core-weight diameters of 8–22 inches (0.203 m–0.560 m). The bottom of the cradle is welded to the pivot pin, which can rotate 360° in its housing. The pivot pin and axle are 2.5-inch (63.5-mm) type-304 stainless steel. This davit is designed for weight-stands weighing up to 2500 pounds (1134 kg).

The corer weight-stand is attached to the davit cradle by chain binders of appropriate strength. The cradle is designed to pivot 360° horizontally, and, for lowering the corer, to swing on the axle to a vertical position. The chain binders are released after the weight of the core rig, in the vertical position ready for launching (Fig. 1), is taken up by the main wire. When the core rig is brought back to the surface, the davit, with attached cradle, swings over to the weight-stand, which is again secured by the chain binders.

In addition to the increased safety and ease of handling, it has been possible to cut the launching and retrieving time in half. The average time for launching, from the time the ship is stopped until the core rig is lowered away, is under ten minutes. This figure was obtained with the use of a 50-foot (15.24-m) barrel and an 1800-pound (816-kg) weight-stand having standard release arm and pilot corer. The time between the reappearance of the corer at the sea-surface and its return to the deck is approximately 15 minutes. Also, it has been possible to core in rougher sea states than was previously safe.

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