DEPARTMENT OF THE ARMY TECHNICAL MANUAL

Operator and Organizational Maintenance Manual

CRANE-SHOVEL, BASIC UNIT, CRAWLER MOUNTED, 40 TON 2 CU YD, DIESEL DRIVEN (W/HARNISCHFEGER ENGINE MODEL 687C-18-ES) (W/CATERPILLAR ENGINE MODEL D333TA)

(HARNISCHFEGER MODEL 855BG)

(FSN 3810-606-8569)

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OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL

CRANE-SHOVEL, BASIC UNIT, CRAWLER MOUNTED, 40 TON, 2 CU YD, DIESEL DRIVEN (W/HARNISCHFEGER ENGINE MODEL 687C-18-ES) (W/CATERPILLAR ENGINE MODEL D333TA) (HARNISCHFEGER MODEL 855BG) (FSN 3810-606-8569)

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CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

a. These instructions are published for the use of personnel to whom the Crane-Shovel is issued. They provide information on the operation and organizational maintenance of the equipment. Also included are descriptions of main units and their functions in relationship to other components.

b. Numbers in parentheses following nomenclature callouts on illustrations indicate quantity. Numbers preceding nomenclature callouts indicate preferred maintenance sequence of removal or disassembly, and reassembly or installation should be performed in reverse order.

c. Report all Equipment Improvement Recommendations as prescribed in TM 38-750.

1-2. Forms and Records

a. DA Forms and records used for equipment maintenance will be only those prescribed in TM 38-750.

b. Report of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to DA Publications.) and forwarded direct to Commanding General, U.S. Army Mobility Equipment Command, ATTN: AMSMEMPP, 4300 Goodfellow Boulevard, St. Louis, MO. 63120.

Section II. DESCRIPTION AND DATA

1-3. Description

a. General. The Harnischfeger Model 855BG Crane-Shovel is a crawler mounted, two cubic yard, 40 ton capacity, diesel engine driven unit. The booms are interchangeable, enabling conversion to shovel, crane, clamshell, dragline, backhoe, or piledriver operation.

b. Revolving Frame. The revolving frame (fig. 1-1) upon which are mounted the engine, upper machinery, and gantry, revolves around a center gudgeon and a live roller circle mounted on the crawler. It carries four hook rollers (two in front and two at rear), which ride on the underside of the roller path, and prevents tipping of the rotating base. A counterweight is fastened at rear of revolving frame. A gantry frame which contains gantry sheaves and harness, is mounted on the revolving frame along with a collapsible high gantry which is provided for use in crane, clamshell, dragline, or piledriver service.

c. Cab. The cab (fig. 1-1) completely encloses all machinery on the revolving frame. It consists of rigid steel frame work and panels. Several hinged doors and sliding panels provide access for removal of engine or machinery. Framed glass windows in operator's compartment can be opened for ventilation or additional visibility. Hand levers and foot pedals in operator's compartment control all motions of revolving frame operating machinery (para 2-8), and are easily within reach of the operator from his adjustable seat.

d. Crawler Mounting. Crawler mounting (fig. 1-2) consists of two crawler tracks and the carbody. Each crawler track consists of forged steel side bars, (pinned together), with track shoes bolted on. Tracks are chain driven by the tread sprocket, and supported by a large idler roller and numerous track rollers. The carbody houses the propelling and steering mechanism.

e. Engine. The crane-shovel units are powered by six-cylinder diesel engines, which operates both deck machinery and crawlers, and are equipped with electrical starting motors. The engine may be either a Harnischfeger Model 687C 18-ES or a Caterpillar Model D333TA, therefore in this manual the component

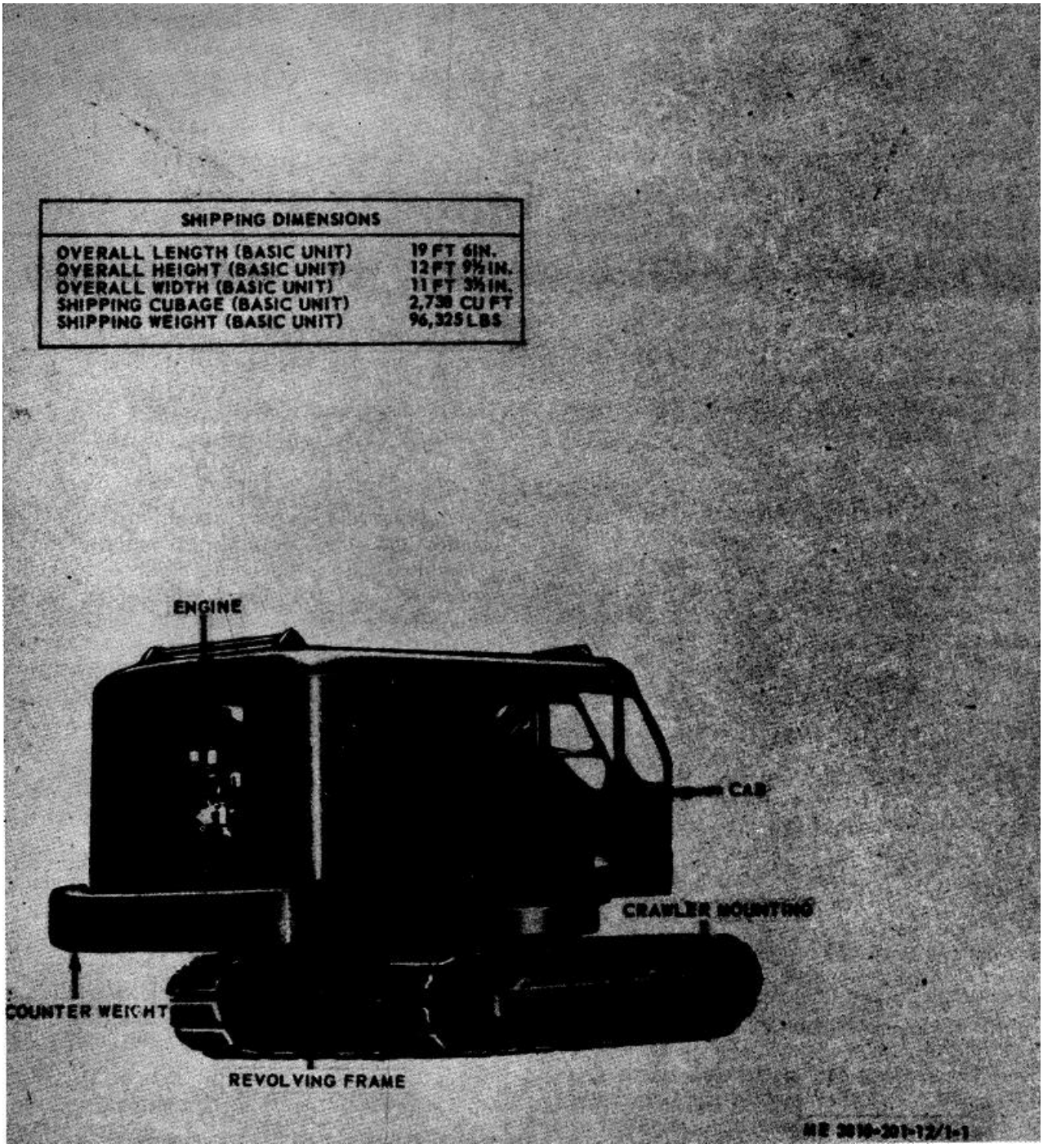

Figure 1-1. Crane-shovel basic unit, right 3/4 rear view, and shipping dimensions.

position on engine will be described in relation to radiator as front end, or flywheel as the rear end. As an example, on Model 687C-18-ES the starting motor is at rear on left side, the generator at front on right side. On Model D333TA, the alternator is. at front on left side, and starting motor at rear on right side. The cylinders are numbered from front to rear.

1-4. Identification and Tabulated Data

a. Identification. The crane-shovel basic unit has seven major identification plates which this paragraph locates and describes. Data contained on them is listed in b below.

(1) Corps of engineers identification plate. This plate is mounted at right of the transportation data plate ((7) below). It specifies the class, nomenclature, stock number, model number, manufacturer's name. and serial number.

(2) Manufacture's identification plate. This plate is mounted on right front of operator compartment

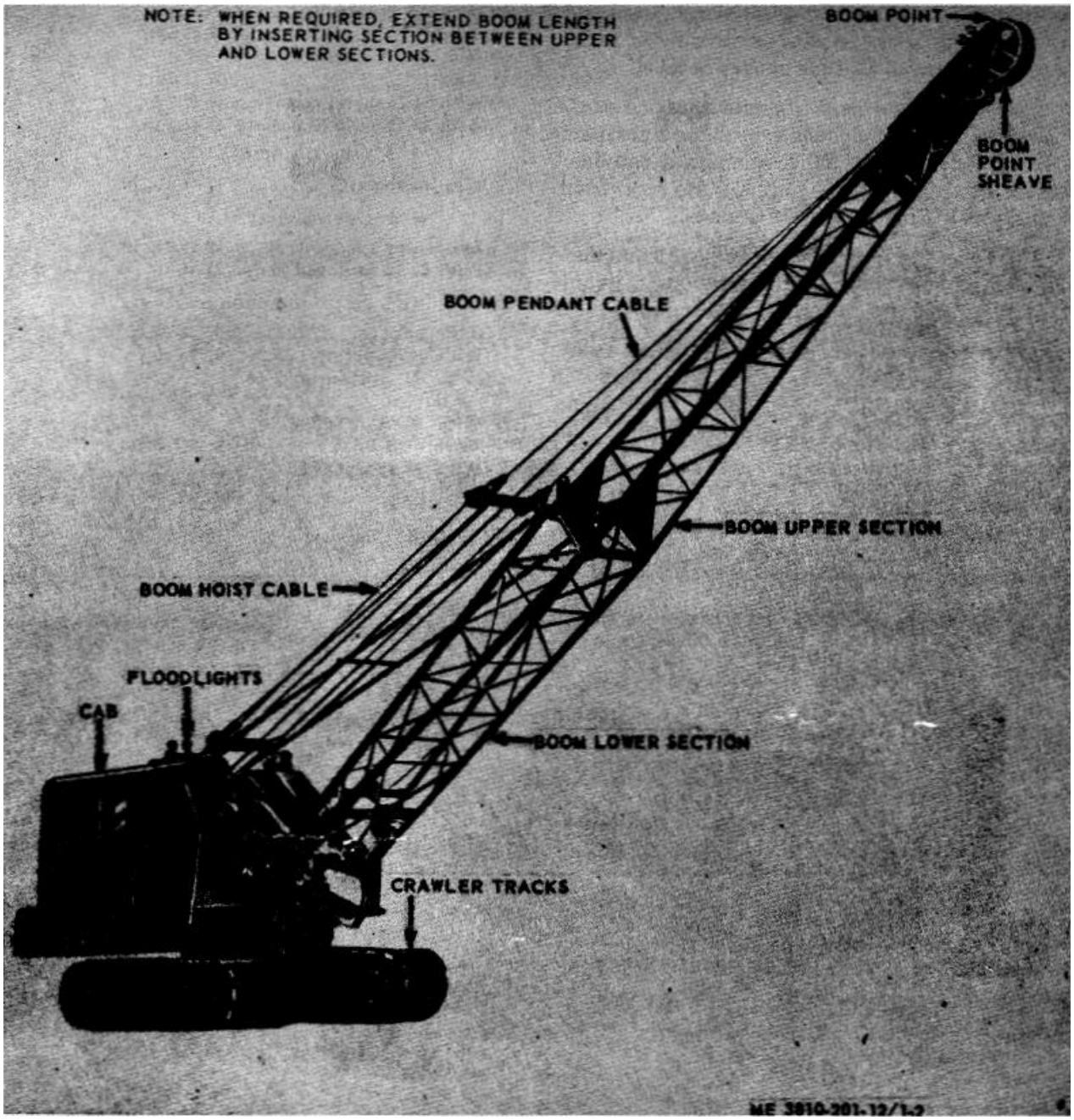

Figure 1-2. Crane-shovel basic unit, with crane boom installed.

directly below the front window. It gives the manufacturer's name, and the unit serial number.

(3) Engine identification plate.

(a) The model 687C-18ES engine identification plate is mounted on upper left side of flywheel housing and gives the manufacturer's name, model number, engine number, bore, stroke, horsepower, revolutions per minute, and firing order.

(b) The model D333TA engine identification plate is mounted on left hand side of No. 6 cylinder wall and gives manufacturer's name and engine serial number.

(4) *Engine specification plate*.

(a) The model 687C-18-ES engine specification plate is mounted on right side of valve cover, and gives engine model number, number of cylinders, displacement in cubic inches, valve lash, type of fuel, injection pump timing, and cooling system capacities.

(b) The model D333TA engine specification plate is mounted on fuel filter and gives model No., No. of cylinders, bore, stroke, high

idle engine rpm, full load engine rpm, rack setting, hp rating at sea level, and warning of turbocharger setting and altitude above sea level.

(5) *Rated load capacity identification plate*. This plate is mounted inside operator's compartment and is located on panel to right of cab door. It specifies operating radius, angles, boom lengths, and lifting capacity in pounds.

(6) *Loading identification plate*. This plate is located on right front side of revolving frame cab. It specifies position of slings for loading.

(7) *Transportation data plate*. This plate is located directly below the loading identification plate ((6) above). It specifies dimensions, cubage, tonnage, height, length, and weights of the crane-shovel unit.

b. Tabulated Data.

(1)General.

Manufacturer	Harnischfeger Corp.
Model	855BG
Designed for use as	Backhoe, clamshell, crane, dragline, piledriver, and shovel

(2)Engines.

(a)Model 687C-1 8-ES.

Manufacturer	P&H Diesel Division, Harnischfeger Corp.
Model	687C-18-ES
Cycle	2
Compression ratio	16 to 1
Displacement	522 cu in. (cubic inches)
Number of cylinders	6
Cooling	Liquid
Horsepower	190 HP (horsepower) at 1,700 rpm (revolutions per minute)
Idle speed	500 rpm
Rotation at flywheel end	Counterclockwise
Firing order	1-6-24-3-5
Governed full load speed	1,800 rpm
Weight	1 900 lbs (pounds)
Valve lash	0.012 in. cold
Injection pump timing	16 degrees below top center

(b) Model D333TA.

Manufacturer	Caterpillar Corp.
Model	D333TA
Bore	4.5 in (inch)
Stroke	5.5 in.
Number of cylinders	6
Displacement	522 cu in.
Horsepower (HP)	190 w/o (without) fan
Idle speed	600 rpm
Governed full load speed	2,000 rmp

(3)*Dimensions and weights*.

(a) Overall length.

(Less boom)	19 ft 6 in.
(With 50 ft crane boom)	67 ft 5 in.
(With 50 ft crane boom and 15 ft jib)	80 ft 4 in.
(With 50 ft dragline boom)	67 ft 5 in.
(With 50 ft clamshell boom)	67 ft 5 in.
(With 24 ft shovel boom)	47 ft 7 in.
(With 23 ft backhoe boom)	41 ft 1 in.

(b)Overall width.

(27% in. shoes)	11 ft 38½ in.

(c)Overall height.

(Less boom and gantry)	12 ft 9½,i in.
(With 23 ft backhoe boom)	21 ft

(d)Shipping cubage.

(Basic unit)	2,738 cu ft
(With 50 ft boom)	9,675 cu ft
(With 50 ft boom and 15 ft jib)	11,600 cu ft
(With 50 ft dragline boom)	9,675 cu ft
(With 50 ft clamshell boom)	9.675 cu ft
(With 24 ft shovel boom)	6,775 cu ft
(With 23 ft backhoe boom)	9,725 cu ft

(e) Operating Weights (approximate).

(Basic unit)	101,025 lbs
(Backhoe)	119,290 lbs
(Crane)	106,400 lbs
(Shovel)	118,600 lbs
(Clamshell)	107,000 lbs
(Dragline)	107,500 lbs
(Piledriver)	. 118,600 lbs

(4) *Personnel heater*.

Manufacturer	Hupp Corp., Detroit, Michigan
Model	H901-24V
Voltage	24 vdc (volts direct current)

(5)*Capacities*.

(a) Engine, model 687C-18-ES.

Crankcase	32 qt (quart)
Fuel filters:	
Primary	% pt (pint)
Secondary	1 pt
Cooling system	36 qt
Air cleaner	4% qt
Oil filters	2 qt

(b) Engine, Model D333TA.

Crankcase	22 qt
Cooling system	33.6 qt

(c) Crane capacities.

Fuel tank	90 gal (gallons)
Swing gear box (oil)	20 qt
Chain case	8 qt
12 Hydraulic cylinders	4 qt
7 Hydraulic cylinders	2 qt
Hydraulic tank	22 qt
Power transfer reduction gear case	8 qt
Horizontal vertical drive gear case	12 qt

(6) *Starter*.

(a) For Model 687C-18-ES.

Manufacturer	Delco Remy