

**MISSOURI DEPARTMENT OF TRANSPORTATION  
45 FT. HYDRAULIC DIGGER-DERRICK UNIT WITH PERSONNEL  
AERIAL BUCKET SPECIFICATIONS**

**GENERAL**

The intent of this specification is to describe a truck mounted 45' sheave height digger-derrick, hydraulic operated unit that will dig various size holes to various depths, provide positive pole control placement, pull existing poles, and elevate personnel to upper work areas quickly and safely.

**UNIT**

The unit shall include the following features: The maximum sheave height shall be 45.2 feet with a maximum horizontal reach of 35.2 feet. The maximum digging radius shall be 24.5 feet. The boom shall operate from approximately 75 degrees above horizontal to approximately 20 degrees below horizontal.

**MOUNTING**

The digger-derrick and bucket unit is to be center mounted on truck chassis directly behind the truck cab with a turntable winch. The mounting shall be done in accordance with the latest recommended manufacturing and business practice. It shall have all necessary supports to prevent overloading of chassis wheels and bearings when the boom is extended and working in extreme positions. Subbase assembly for mounting of derrick pedestal and outriggers, to consist of 6-inch x 4-inch tubing (3/8 inch wall) each side of chassis frame with top and bottom plate.

**OPERATION AND CONTROLS**

Controls for all functions shall be located at each of these stations. Upper controls shall be included for operator in bucket. Upper controls, transferable from Intermediate to Upper Boom, include four individual levers for: Lift, Rotation, Intermediate and Upper boom Extension/Retraction with Sequential Operation, and Winch Control. One knob for on/off (dump valve) including automatic two-speed throttle shall be installed. There shall be a power package to boom tip that provides hydraulic hoses, etc. for pole guide, upper control, or tool circuit at boom tip. Manual override of hydraulic functions shall be provided. Hydraulic pressure gauge is to be provided at the main control location. Warning light at control panel that indicates when oil filter needs changing shall be included. Control Panel to be lighted.

**HYDRAULICS**

The hydraulic system shall be complete for all functions with quality components to assure system integrity. Complete Hydraulic system to include an open center hydraulic system, tandem vane pump, two inch shut-off valve between pump and reservoir, magnetic separator filter, return line filter with warning light, two hydraulic pressure gauges, one for each pressure circuit. There shall also be a hydraulic dump valve for diverting hydraulic flow to the reservoir when no functions are being operated. Cab control, heavy duty SAE PTO to be air shifted on chassis with air brakes. The hydraulic reservoir shall be mounted at front of cargo area. Hydraulic Tool Circuit at boom tip to provide adjustable flow of 5.0 to 8.0 gpm and adjustable pressure from 1,500 to 2,000 psi. (Set) of two 50-foot hydraulic hoses with two quick disconnect couplings, dust caps, and fittings for hydraulic tool use installed on manual reel.

**UNIT AND HYDRAULIC ACCESSORIES**

Crosby Laughlin 8.5-S-1 swivel block (33 pound downhaul weight)  
4 foot x 2 inch Endless nylon type sling and 4 foot x ½ inch wire rope sling.  
18 inch diameter auger, full flight with Pengo boring head and 2 ½ inch hex.  
9 inch diameter auger, full flight with Pengo boring head and 2 ½ inch hex.

Stanley or equivalent hydraulic tamp complete with three feet of hose and quick disconnect couplings with three foot handle.

#### DERRICK, BOOMS AND TURRET

The derrick shall be hydraulically powered and controlled. The boom shall be three section, hydraulically telescopic with rotating turret on a truck mounted fixed steel base. Rotation shall be continuous and provided by high efficiency worm gear drive, driving a shear ball bearing rotation gear. 115 feet length of ½ inch wire rope with eye in each end to be included. The booms shall have a rated capacity of approximately 15,000 lbs. The boom shall operate from approximately 84 degrees above horizontal to approximately 17 degrees below horizontal.

#### DERRICK AND AUGER PROTECTION

Overload and stowage protection must be provided to the complete unit. The overload protection system must allow all functions to automatically become operational when the overload problem has been eliminated and the boom and auger protection systems must protect against damage from excessive pressure when the stow function is complete. The unit structure must be protected from excessive side loading and the auger, digger and bucket mechanism must be protected when unstowing.

#### DIGGER AND AUGERS

The digger shall be two-speed hydraulically shifted, planetary gear drive producing up to 12,000 ft/lb. torque. To include rapid auger, shake control, 2-½ inch hex output shaft, and high speed dirt spin-off control. Complete auger storage shall be provided including self-latching storage bracket, hydraulic auger release, and digger transfer mechanism that includes automatic auger pick-up device and auger stow protection.

#### POLE GUIDE

The pole guide is to be mounted on the boom flares and shall be rack-and-pinion type for open and closing action. The opening, closing, and tilting are to be accomplished by hydraulic cylinders. A bolt-on type extension that allows for larger diameter poles to be enclosed shall be included.

#### WINCH

The winch shall be a 15,000 pound bare drum capacity boom tip winch, self-locking, high torque, worm gear winch, equipped with oil cooled brake with special provisions on drum for attaching wire rope or polypropylene rope. Boom tip winch to be standard.

#### PIVOT POINT PINS

All major load bearing pins shall be plated. All pivot points are line bored or reamed and pins have keepers.

#### OUTRIGGERS

Auxiliary flat shoe A-frame outriggers, installed at rear, with 149-inch maximum spread at ground level. A-frame outriggers installed at the pedestal. A system that prevents the operation of the booms until outriggers are lowered shall be installed. A system that provides an audible signal when the outriggers are in motion shall be installed. Telescopic type outriggers are to be provided. Each is to be individually controlled and have lock checks for both raised and lowered positions assuring positive holding under all conditions. Valves for outriggers installed at tail shelf.

#### ELECTRIC ACCESSORIES

Lights and reflectors in accordance with FMVSS #108 lighting package, to be installed.

Berg or equivalent seven (7) pole electrical trailer connection installed.

2000 watt inverter (Dimension brand-pure sine) to be installed. One electrical outlet at the rear of the body.

Backup alarm to be installed at rear.

Lights package to be provided by MoDOT. Installation of package shall be bid as an option.

### BODY

Steel flatbed body, suitable for installing on any single rear axle chassis with 120 inch CA dimension. Body to be built in accordance with standard specifications, including:

126 inch overall body length

93 inch outside width

stake pockets mounted in the flatbed on 18" centers

Grab handles need to be installed, one each side at rear. Cable suspended stirrup steps installed, one each side at rear. Storage bracket for anchor 9" auger. Manually operated reel for storage of two 25 feet lengths of hose (18 inches high x 15 inches long x 14 inches wide).

### BODY ACCESSORIES

Pintle hook with frame reinforcement and two safety chain rings installed at 28 inches (+/- 1 inch) from ground to center of eye.

(Set) splash aprons, installed behind rear wheels.

Triangular reflector kit installed in cab behind seat on passenger's side.

Two 10-pound fire extinguishers with mounting bracket, shipped loose.

Rubber dock bumpers installed on right and left side of frame at rear.

(Set) tow hooks installed at front of chassis.

### COLOR

Color to be standard manufacturer's white.

### MISCELLANEOUS

Wheel chocks, (rubber) 10 inches long x 8 inches wide x 50 1/2 inches high to be included. Wheel chock containment installed in body. Travel height placard mounted in the cab in a location visible to the driver. Completed vehicle needs DOT Certification.

### OPTIONAL ITEM - PERSONNEL BUCKET

A non-flammable fiberglass self-stowing pin-on type, one-man bucket shall be provided for mounting on the booms third stage. The bucket shall be approximately 24" x 24" x 44" self-leveling, have exit or entry step and have positive hold in any position. A bucket safety belt, lanyard, and cover shall be provided. Polyethylene liner fastened with nylon bolts shall also be installed.