

# HIRAIL BUCKET TRUCK SPECIFICATIONS

## DOCUMENT

HiRail Bucket Truck will have the following major items:

- Truck
  - Diesel Engine
  - Chassis
  - Truck Body
  - Rear Deck Work Area
- Rail Gear, Under-cab and Rear; Must meet Federal Rail Administration (FRA)
- Low speed Creep Drive System controlled from Aerial Lift
- Aerial Device with Bucket Rotation and Material Handler
- Wire Manipulators
- Additional Features
  - 110 volt AC inverter
  - Light Package
  - Interlock Systems
  - Camera System

Optional Equipment:

- Non-metallic contact surfaces for Wire Manipulator head
- Spare radio transmitter that will work on both the platform and bucket truck
- Rear mounted Capstan

## TRUCK

### Requirements:

- Structural
  - Tandem axle truck 6 x 4, 20k front, 34k rear
  - Frame Rail section Outer "C" Channel, Heat Treated Alloy Steel (120,000 PSI Yield); 10.813" x 3.892" x 0.312"
  - Wheel Base is 189"
- Engine: Diesel engine, Tier IV, 365 Horse Power
  - Meets latest emissions requirements
  - Allison automatic transmission with PTO and hydraulic pumps
- Front and rear bumpers, steel channel added to truck for Pintle and D-ring Support
- Truck height 12'6" on tires (max 13'6")
- Truck height 13'6" on high rail (max 14')
- Truck Color: White
- Cab: Passenger seat is a bench to accommodate driver and 2 men. Equipped with heating, air conditioning and radio. Left hand driver. Steps to ground when on the tracks.
- Tires: Super Single 445/65Rx 22.5 rear tires, use widest available, to be centered on rail. Offset wheel may be necessary.
- No spare tire
- Fuel: Tank 40 gallon capacity to allow 10 hours of idle time if feasible.
- Sensors/Alarms:
  - Back up camera and alarm is active on tires/rail gear and turns to side view when using signals.
- Lights, front and rear end to meet FRA requirements
  - Front End: 2 white lights that stay on all the time, 2 red rear lights
  - Rear End: 2 white lights, 2 red rear lights
  - If put in forward drive, front white lights and back red lights are engaged. If put in reverse, front red lights act as reverse lights, and rear white lights turn on.
- Electric Trailer connections, both 6-pin and 7-pin connection plug in, easy to access and beside each other currently use Cole Hersee Brand
- Spotlights, possibly LEDs to keep wattage low
  - One telescoping and articulating pole, mounted behind cab and stows down



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- Lights for each rail gear to watch them being put down, 4" lights, switch to turn the lights on.
- Lights for deck area
- 20 ton heavy-duty Pintle Hooks attached to front and rear with safety chain d-rings
- Truck should have two wire manipulators.
- Legal in California

## **TRUCK BODY / REAR DECK PLATFORM**

Requirements:

- 1 ft. deep bed; Shelf to put tools and material on
- Steel deck, non-skid surface
- Steps that fold down, grab handles, cable or conveyer belt for flexible bottom step for 3 point contact.
- 110Vac power outlet, plugs at rear of truck, one near passenger side and power from 3000W inverter
- 1 Hydraulic Tank with selector valves, full flow relief valves, and section pumps
- Truck Body
  - Removeable storage boxes, Forklift pockets for removal
  - Fixed storage boxes to store personal tools, may be placed below the bed and behind the cab.
- A type Outriggers will be installed on the chassis at the rear

## **RAIL GEAR**

Requirements:

- 56.5 inside to inside rail dimension, considered standard gauge
- 6 inch max super elevation
- 6% max grade
- Turning radius of 100ft radius.
- 20 mph travel speed when driving from cab on the rail, not using Creep Drive
- Front rail gear installed under cab, behind front axle. Rear rail gear is placed close enough to meet required turning radius while still being stable.



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- Brakes on Rail Gear
- Non-insulated rail gear wheels

Brand: Diversified Metal Fabricators (DMF)

Model: DMF 1630 Rail Gear with optional rail brake assist

## **RAIL DRIVE SYSTEM / INTEGRATED CONTROLS**

### Creep Drive System

- Creep drive system will be installed, speeds are auto limited: slow speed is 2-3 mph while on platform if not stowed (proportional control) and 5 mph with it stowed, while driving from bucket
- Hydraulic brake on rail gear and fail safe brakes on truck.
- Forward and reverse, equal speed range and controlled deceleration
- Radio Controls
- For use on Rails only

## **BUCKET AERIAL LIFT**

Equivalent to: Altec ALB-42

### Requirements:

- Bucket: 1 man, 24" x 30", 350lb capacity. Two steps incorporated into design of bucket for good access into the aerial platform
- Lanyard anchor tie off points and applicable safety/warning signs
- Rotation of bucket 180° to allow bucket on either side of boom, hydraulically actuated
- Reach and Height: 18ft side reach, 25ft max height to bottom of platform at 18ft reach
- 41ft height boom
- 360° Continuous rotation of boom
- Insulated boom 46kV
- Must have material handler



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## Features of Aerial Lift:

- Bucket Remote Controls: Control panel that includes controls for driving truck, (creep drive), winch, wire manipulator, boom and measuring device. Pistol grip controls for bucket functions. Separate functions to be neat and easy on a single control. Diversified would add to an existing crane control panel. Battery to be switched out with one charging in the cab to keep controls in the bucket.
- Bucket mechanical control of telescoping and crane movement is allowable
- Outriggers installed on sides, but not used while working on rails. Outriggers used in some off rail situations and may be in a unique situation on the rail.
- Bucket Controls:
  - Standard 3 function bucket joystick for boom raise/lower, boom extend/retract and boom swing cw/ccw
  - Winch in/out hyd lever
  - Bucket rotation hyd lever
  - Material handler rotate hyd lever
  - Engine stop/start switch
  - Forward/reverse travel control proportional joystick
  - Emergency lowering air cylinder uses an electric over hydraulic switch at the base of the boom
  - E stop switch
  - Wire position arms up/down joystick #2
  - Wire position arms extend/retract
  - Measuring device up/down switch (option)
  - Lights switch
  - Horn switch
  - No outrigger, No high rail
  - Tool circuit

## Material Handler:

- Material handling of 350lb (can use 900lb rated for best durability)
- Top mount or with side mount jib with winch with full hydraulic and controls in bucket. Jib must be high enough to put load at working height for men in bucket
- Ability to stow
- Cable on handler (+41'), shackle and sling hanging from cable
- Extend/Retract



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## WIRE MANIPULATORS

### Requirements:

- 27' max height to messenger wire
- 36 in. travel for manipulator, beginning from stowed extended to side of truck
- Wire pull 800lb side force on a track's curve, picking up 400lb with wire at 26'6" high and worst case scenario

### Features of Wire Manipulator:

- Will pick up wire, move and hold wire in place
- Operated by remote control
- Telescoping and stows, located on top of the cab
- Performs all work without truck on outriggers, will be on rails
- Can be easily removed from the truck
- The fingers to hold the wire should be changeable in case a different configuration is needed (Non-metallic contact surfaces are optional)
- Equipped with lift eyes for installation or removal from the truck
- Must have good access if necessary for servicing and a lanyard tie off
- A light will come on in the cab when the wire manipulator arm is extended or lifted, i.e. not in stowed position
- Must have a properly stowed position with cylinders fully retracted
- Controls to include slow /fast speed
- See load chart next page for limits of wire manipulator. With platform centered, the goal is to rate machine to limits of the wire manipulator. When the platform is rotated the manipulator rating may have to be down rated.

## ADDITIONAL FEATURES

- Pintle Hooks, 20 ton hooks on front and back, D-rings
- Meets FRA regulations
- Counterweight for stability, plates on rear of turret
- One common hydraulic tank
- One hydraulic function at a time, might need 2 functions at a time. Peak pressure 3,000 psi for most function, creep drive may be higher pressure
  - Extend/retract
  - Lift/lower
  - Winch in/out
  - Bucket rotation left/right
  - Rail Gear
  - Crane leveler
  - Material Handler
  - Wire manipulator
  - Creep drive
  - Measuring device
- Priority and inter-locks must be in the electrical system.
- Deutsch connectors, wash down capable connectors, cables and wire connections to be top quality and sealed.
- Oil cooler
- Strobe lights on headache rack, front and rear bumper
- Switch to indicate stowed or unstowed height of platform
  - Light on in cab if not completely down
  - High creep drive speed only when stowed
- Swing lockout on one side or other to stay off adjacent track when it is live. A soft electric stop with hard mechanical stop
- Hydraulic E stop on rear and side with guard
- Engine stop start from rear and side control panel
- Manipulator cannot be used if boom is extended more than 23'



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