Hydraulic Self-Propelled Crane
FMC's new hydraulic self-propelled crane with flat deck carrier design

Results in greater travel and operating stability

FMC offers an additional model to the mid-size hydraulic self-propelled crane class, the HSP-22, a 22-ton (20 metric ton) machine. The FMC designed and manufactured carrier features a flat deck design. Major components are mounted low in the frame, resulting in a lower center of gravity for greater travel and swing stability and increased on-tire lifting capacity in the operating ranges. The practical design of the flat deck carrier also permits operator cab access throughout the 360° swing of the crane upper.

Removal of the engine panels on the flat deck reveals a low mounted engine

Engine radiator and transmission are rubber shock-mounted to the frame.

The HSP-22 carrier not only provides for a lifting base, but also for optimum maneuverability in congested areas. The carrier is equipped with an automatic shift transmission controlled by a single lever. An air cylinder shifts the transmission from reverse to the forward speeds.

For added safety and minimum effort, 2-wheel, 4-wheel and crab-style steering

assembly which includes an oil cooler (A) as standard. The air cylinder (B) regulates the throttle of the engine. In addition to providing a smooth acceleration and deceleration of the

Pressurized sump tank with fillers

Fuel tank (not visible)
maintain tire traction. For a more rigid lifting base, when swinging beyond 15° either side of center, the rear axle is automatically locked in position by two large hydraulic cylinders. An operator controlled lock-out override allows for oscillation adjustment, if necessary.

The low, in-line, carrier power train concept of the HSP-22 is a simple efficient design. A unique offset drive system enables the engine to be mounted low in the frame while still maintaining a direct in-line drive to the transmission. The transmission powers the front axle for 2-wheel drive operation, and by activating a control console mounted switch, an air actuated clutch permits power to be supplied to the standard driving rear axle for 4-wheel drive operation.

The front and rear planetary drive axles are each equipped with a high traction differential. They allow one wheel to assume up to 60% of the available axle torque for traction on uneven ground.

The crane upper is mounted to the carrier by a turntable bearing with integral swing gear.

The HSP-22 rear axle oscillates when travelling over uneven ground to

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**Diagram Notes**

- Engine
- Offset drive
- Transmission
- Pumps
- Planetar rear axle
- Pump disconnect
- Planetar front axle
- Carrier power train
- Jack cylinder check valve (p-7)
Extended, low profile revolving upperstructure with accessible rope drums

The HSP-22 revolving upperstructure design introduces a new concept to the hydraulic self-propelled crane user. Following the same concept of the carrier, the major components are mounted inside the extended, low profile frame. This lowers the crane's center of gravity for greater stability and lifting capacity. It also provides increased accessibility to the rope drums and components.

To obtain an optimum weight to strength ratio the entire upper frame was subjected to an extensive testing program in the FMC Applied Mechanics Laboratory. Powerful hydraulic rams apply real-life loadings to simulate the stress imposed under actual crane working conditions. Strain gauges applied directly to the metal surface detect the strain as force is applied to the structure. The strain data is then recorded through the use of sophisticated, sensitive acquisition systems. An elaborate program helps to assure a superior/total product.

The hydraulic power for the upperstructure functions is provided by gear-type hydraulic pumps driven off an extended engine/transmission shaft in the carrier. A cab controlled, air actuated pump disconnect is standard.

Power for the two low mounted rope drums (A) is from the bi-directional motors (B) into the planetary reduction unit (not visible) which is mounted inside and connected to the rope drum. An automatic spring applied, hydraulically released load holding brake (C) is standard. Holding valve (D) which is directly connected to the motor prevents uncontrolled load lowering. High-speed
load hoist is standard on the main drum and auxiliary drum (optional).

The 360° swing power is from the bi-directional tandem gear-type motor (E) into the FMC reduction unit (F) and then into the swing shaft/pinion. "Free-swing" or "metering swing speed" is possible. Results in smooth swing acceleration and deceleration, and permits centering of the boom over the load before the load is lifted. A manually controlled swing brake (G) plus a pin-type swing lock is standard. A 360° swing lock is also available.

The modular and humanized operator's cab is the result of FMC's styling and design engineering group. Directly in front of the operator is the luxurious yet functional control console with full complement of instruments. Conveniently located control lever for the crane functions are to the right and left of the steering wheel. Control console includes boom angle indicator, hydraulic pump disconnect, and rear axle drive disconnect. Transmission shift lever and swing brake lever are located to the right of the operator. An electric boom length indicator is optional. For operating visibility and comfort, the cab is equipped with a sliding rear window, hinged roof window, and a removable front window. The cab is rubber-mounted to the frame. Interior cab insulation is standard.

The practical design of the low-profile crane upper mounted on a flat deck carrier is an ideal combination for an operator to have unobstructed visibility when operating over the front, rear or sides.
Exclusive boom design embossed with diamond-shaped depressions

The 3-section power boom design is an exclusive FMC engineering achievement. With the aid of the Applied Mechanics Laboratory and extensive testing, the boom design (patented) was developed to consist of minimum gauge side plates along with 100,000 p.s.i. (689 500 kPa) yield strength steel angles in the four corners resulting in a more durable boom.

To maintain the tolerances and precision established by engineering, FMC made a considerable investment in custom designed machine tools and an all new facility for manufacturing the boom.

The side plates are embossed with a 1200-ton (1 088 metric ton) hydraulically operated press. The embossing of the minimum gauge boom side plates increases the strength and stiffness while keeping the weight at a minimum. The diamond shaped depressions were adapted to the design to allow for the natural flow of boom stresses (both compressions and tensions) and avoid high stress risers when a load is lifted.

To eliminate undesirable welds in the corners of the boom, the side plates are precisely welded by automatic welding machines to specially machined corner angles. The angles promote greater boom rigidity while
section. All of the shoes are readily accessible for serviceability. The rear wear shoes are lubricated through external fittings located at the head of each section. It is not necessary to dismantle the boom for wear shoe replacement.

The total power boom length is 28' 6" - 70' (8.69 - 21.34 m). Also available is a 25' (7.62 m) swing around lattice fly or with an additional 20' (6.10 m) lattice section, a 45' (13.72 m) jib.

Hydraulic out-and-down outriggers are standard. Beams are full width with individual controls for extending the beams and lowering the jacks. Outrigger controls are conveniently located under the right arm-rest in the operator's cab. Once the outriggers are set, an automatic check valve attached directly to the jack cylinder "locks" oil in the cylinder to secure the jack in place. The two-position floats are pinned to the jacks.

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FMC's exclusive boom design (patented) increasing the overall reliability. The corner angles are able to absorb and efficiently transmit the boom stresses which occur when lifting a load.

To maintain proper alignment of the power boom sections, the FMC boom design incorporates the use of wear shoes which are positioned on the top, bottom and sides of each power

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Outrigger controls

Float in stored position