



Rodney Hunt
A ZURN Company
Hoisting Equipment

Equipment

Hoisting

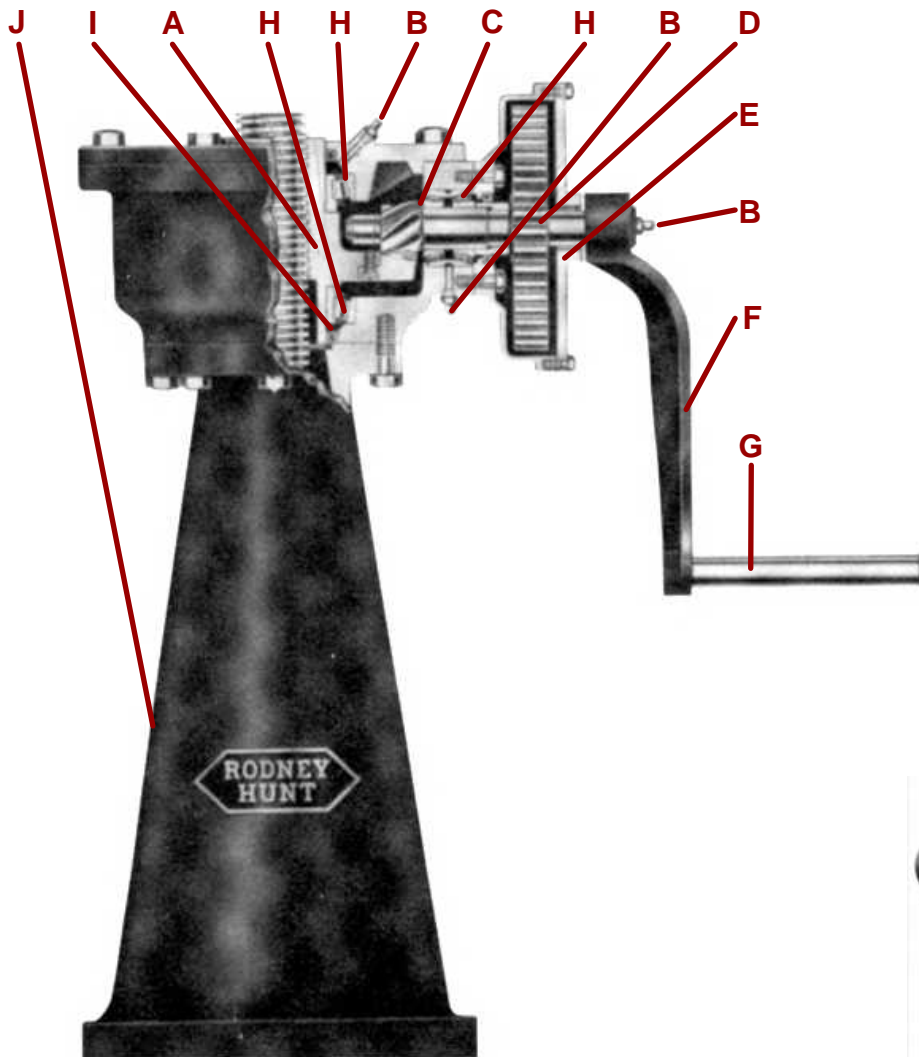




Floor Stands and Bench Stands

Rodney Hunt offers a complete line of floor stand and bench stand hoists to meet every operating requirement, as well as interconnected systems, portable hoist operators, motor-operated hoists, hydraulic actuators and automatic control arrangements. All handwheel and crank operated floor stands and bench stands are selected so that no more than 40 lb. effort on the handwheel or crank is required to open or close the sluice gate or slide gate. They are designed to withstand without damage, at least a 200 lb effort on the handwheel or crank.

Completeness of the line permits economical selection of the most suitable equipment for any specified operating condition. Our experienced Engineering Department is always available for consultation and to make recommendations. Hoists and accessory equipment with accurately rated capacities are the result of many engineering studies and laboratory tests conducted by Rodney Hunt. They have been tested for strength and capacity under all types of conditions. Field-tested in thousands of installations, this equipment has proven its superiority by its ease of operation and continuously reliable performance.



- A** Bronze Operating Nut
- B** Lubrication Fittings
- C** Bevel Gears
- D** Cut Spur Gears
- E** Needle Bearing and Oil Seal
- F** Removable Crank
- G** Sleeved Grip
- H** Tapered Roller Bearings
- I** Mechanical Seal
- J** Pedestal

CRANK-OPERATED FLOOR STAND



HANDWHEEL-OPERATED BENCH STAND

Crank-operated Floor Stands



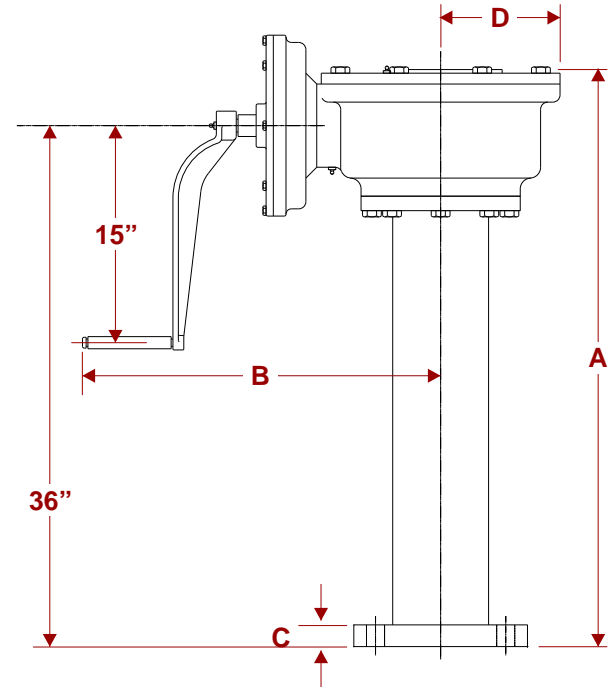
Standard Features

- BRONZE OPERATING NUTS
- TAPERED ROLLER BEARINGS THROUGHOUT
- MECHANICAL SEALS
- PRECISION-CUT GEARS
- WEATHERPROOF HOUSINGS
- STAINLESS STEEL PINION SHAFTS
- LUBRICATION FITTINGS
- SELF-LOCKING AT ANY POSITION OF STEM TRAVEL

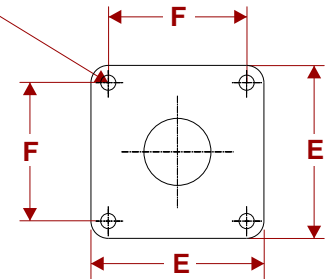
Specifications

The geared floor stand shall have a weatherproof, cast iron housing, with a bronze operating nut, mounted on a high strength pedestal. The operating nut shall be internally threaded with 29° acme threads corresponding to stem threading. Tapered roller bearings shall be located above and below the bronze operating nut to support the output thrust of the floor stand. The gearing shall be accurately cut and of proper design to support the load conditions without undue stress. The stainless steel pinion shaft will be mounted on tapered roller bearings to provide low friction operation and to resist axial and radial thrusts. Mechanical seals shall be provided around the operating nut and the pinion shaft to prevent lubrication from leaving the unit and moisture from entering the sealed housing. The reduction gear case shall be precision machined and equipped with tapered roller or needle bearings and sealed about the reduction shafts. Lubrication fittings shall be provided for all bearings.

Crank operated floor stands will be selected so that no more than a 40 lb. effort on the crank will be required to open or close the sluice gate or slide gate.



4 HOLES - G SIZE FOR H SIZE ANCHOR BOLTS



Note: S-5001.5 and 5002.5 have a 12" long crank.

TABLE OF DIMENSIONS (Inches)

FLOORSTAND APPROX. MODEL	WEIGHT LBS.	A	B	C	D	E	F	G	H
S-5001.5	100	40	11	1 1/4	4	10	8	7/8	3/4
S-5002.5	170	40	15	1 1/4	4 1/4	10	8	7/8	3/4
S-5004	325	40	22	1 1/2	6	12	9	1 1/4	1 1/8
S-5012	380	40	25	1 1/2	6	12	9	1 1/4	1 1/8
S-5020	405	40	25	1 1/2	6	12	9	1 1/4	1 1/8
S-5036	780	40	28	1 7/8	9	17	14	1 3/8	1 1/4
S-5054	830	40	28	1 7/8	9	17	14	1 3/8	1 1/4

CRANK TURNS REQUIRED TO MOVE GATE 1 FOOT

FLOORSTAND MODEL	INPUT SHAFT SPEED	NUMBER OF THREADS PER INCH			
		4	3 1/2	3	2 1/2
S-5001.5	Single	72	63		
S-5002.5	Single	120	105	90	
S-5004	Single	168	144	120	
S-5012	High	144	120		
	Low	472	394		
S-5020	High	144	120		
	low	720	600		
S-5036	High	240	200	160	
	Low	1200	1000	800	
S-5054	High	240	200	160	
	Low	2100	1750	1400	



S-5001.5
1.5:1 Ratio
Single-Speed
S-5002.5
2.5:1 Ratio
Single-Speed



S-5004
4:1 Ratio
Single-Speed



S-5012
4:1 Ratio
12:1 Ratio
Two-Speed



S-5020
4:1 Ratio
20:1 Ratio
Two-Speed



S-5036
6.6:1 Ratio
33:1 Ratio
Two-Speed



S-5054
6.6:1 Ratio
54:1 Ratio
Two-Speed

OUTPUT WITH 40 LB. EFFORT ON CRANK (Pounds)

STEM DIA.	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4
NO THRDS PER INCH	4	3 1/2	3 1/2	3	3	3	2 1/2	2 1/2	2	2	2	2
S-5001.5	4575	3875										
S-5002.5	7625	6450	4950	4675	4200							
S-5004			9875	9325	8400	8000	7000					
S-5012				24750	22275	21200	18550					
S-5020					34000	32375	28325					
S-5036						57800	52000	48300	43800	41100	38900	36900
S-5054							85300	79300	72000	68200	63900	60500

Crank-operated Bench Stands

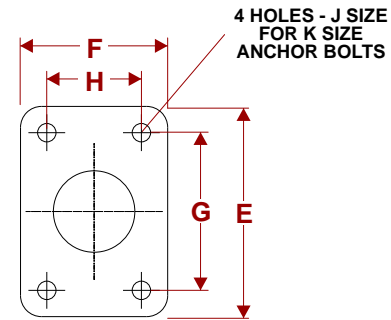
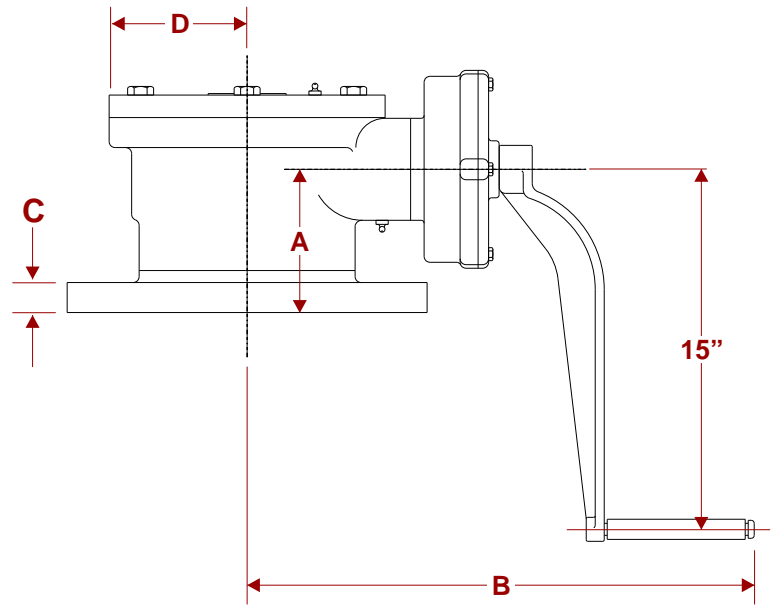


Rodney Hunt bench stands are the same as floor stands except the base plates are used for mounting instead of pedestals. They have the same outstanding construction features and cover the same capacities as floor stands. Bench stand hoists are suitable for any application where convenient operating height is provided by either concrete pedestal, wall bracket or structural yoke.

Specifications

The geared bench stand shall have a weatherproof, cast iron housing, with a bronze operating nut, mounted on a high strength cast iron base plate. The operating nut shall be internally threaded with 29° acme threads corresponding to stem threading. Roller bearings shall be located above and below the bronze operating nut to support the output thrust of the bench stand. The gearing shall be accurately cut and of proper design to support the load conditions without undue stress. The pinion shaft will be mounted on tapered roller bearings to provide low friction operation and to resist axial and radial thrusts. Mechanical seals shall be provided around the operating nut and the pinion shaft to prevent lubrication from leaving the unit and moisture from entering the sealed housing. The reduction gear case shall be precision machined and equipped with tapered roller or needle bearings and sealed about the reduction shafts. Lubrication fittings shall be provided for all bearings.

Geared bench stands shall be crank operated with maximum crank effort not to exceed 40lbs. The bench stands shall be designed to withstand, without damage, at least 200 lb. crank effort.



Note: S-5001.5 and 5002.5 have a 12" long crank.

TABLE OF DIMENSIONS (Inches)

BENCHSTAND MODEL	APPROX. WEIGHT LBS.	A	B	C	D	E	F	G	H	J	K
		BS-5001.5	40	3	11	3/4	4	10	7	7 1/2	4 1/2
BS-5002.5	110	6	15	3/4	4 1/4	10	7	7 1/2	4 1/2	7/8	3/4
BS-5004	160	6	22	1 1/4	6	13	10	10 1/2	6	1 1/8	1
BS-5012	215	6	25	1 1/4	6	13	10	10 1/2	6	1 1/8	1
BS-5020	240	6	25	1 1/4	6	13	10	10 1/2	6	1 1/8	1
BS-5036	470	7	28	1 1/4	9	15	12	12	8 1/2	8 1/2	1 1/4
BS-5054	520	7	28	1 1/4	9	15	12	12	8 1/2	8 1/2	1 1/4

CRANK TURNS REQUIRED TO MOVE GATE 1 FOOT

BENCHSTAND MODEL	INPUT SHAFT SPEED	NUMBER OF THREADS PER INCH				
		4	3 1/2	3	2 1/2	2
BS-5001.5	Single	72	63			
BS-5002.5	Single	120	105	90		
BS-5004	Single	168	144	120		
BS-5012	High		144	120		
	Low		472	394		
BS-5020	High		144	120		
	low		720	600		
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	Low		1200	1000	800	
BS-5054	High		240	200	160	
	Low		2100	1750	1400	



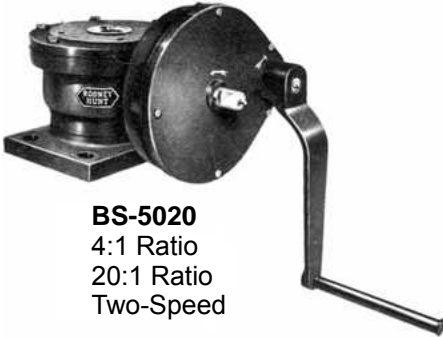
BS-5001.5
1.5:1 Ratio
Single-Speed
BS-5002.5
2.5:1 Ratio
Single-Speed



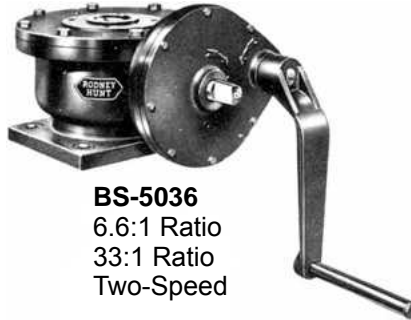
BS-5001.5
4:1 Ratio
Single-Speed



BS-5012
4:1 Ratio
12:1 Ratio
Two-Speed



BS-5020
4:1 Ratio
20:1 Ratio
Two-Speed



BS-5036
6.6:1 Ratio
33:1 Ratio
Two-Speed



BS-5054
6.6:1 Ratio
54:1 Ratio
Two-Speed

**Special Gear Reduction Unit
BS 18004**

Large, self-contained gates that are nut operated require a vertical input shaft. Because of the high thrust loads resulting from gate size and operating head, it is impossible to operate such gates without a gear reduction unit. Rodney Hunt Company offers a 4:1 ratio, spur-gear bench stand with vertical input shaft for this application. This bench stand, shown in the photo at the right, is totally enclosed and equipped with tapered roller bearings and mechanical seals.



OUTPUT WITH 40 LB. EFFORT ON CRANK (Pounds)

STEM DIA.	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4
NO THRDS PER INCH	4	3 1/2	3 1/2	3	3	3	2 1/2	2 1/2	2	2	2	2
BS-5001.5	4575	3875										
BS-5002.5	7625	6450	4950	4675	4200							
BS-5004			9875	9325	8400	8000	7000					
BS-5012				24750	22275	21200	18550					
BS-5020					34000	32375	28325					
BS-5036						57800	52000	48300	43800	41100	38900	36900
BS-5054							85300	79300	72000	68200	63900	60500

Handwheel-operated Floor Stands and Bench Stands

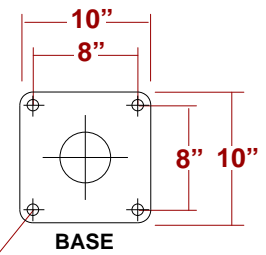
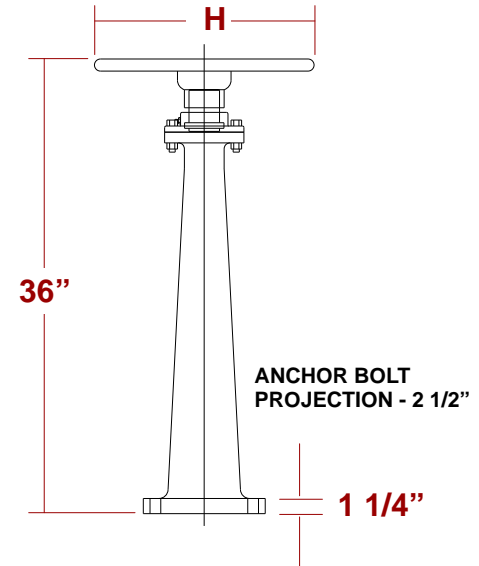


Handwheel operated, roller bearing equipped floor and bench stands for operating sluice gates and valves have many distinct advantages. When the lifting loads are within their range they are easy to operate and economical. Because there is no gear ratio, they offer the fastest operation. The smooth steel handwheel can be easily removed to prevent unauthorized operation.

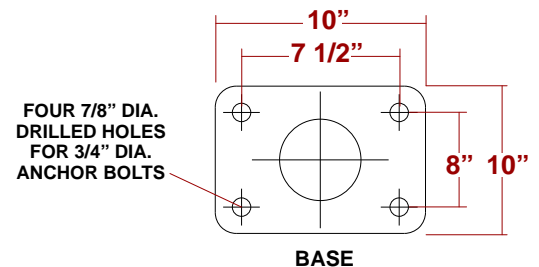
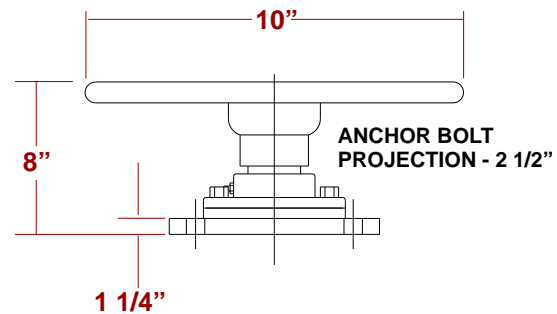


S-2600

The S-2600 hand wheel operated floor stand is a single-speed type with pedestal and head. The head contains a solid bronze operating nut accurately machined and internally threaded. It is completely mounted with anti-friction bearings. The floor stand is designed to operate the gate with a handwheel effort not exceeding 40lbs., and is designed to withstand, without damage, at least a 200 lb. handwheel effort.



FOUR 7/8" DIA. DRILLED HOLES FOR 3/4" DIA. ANCHOR BOLTS



FOUR 7/8" DIA. DRILLED HOLES FOR 3/4" DIA. ANCHOR BOLTS

OUTPUT WITH 40# EFFORT ON HANDWHEEL (Pounds)						
STEM DIA.	1	1 1/8	1 1/4	1 1/2	1 3/4	2
ACME THRDS. PER INCH.	4	4	4	3 1/2	3 1/2	3
HANDWHEEL DIA. (H)						
	16	2410	2200	2000		
	18	2710	2470	2250	1910	
MODEL S-2600	24		3300	3000	2550	2240
BS-2600	30		4120	3760	3190	2800
					2450	

Rodney Hunt bench stands are the same as floor stands except that cast-iron base plates are used for mounting instead of pedestals. They have the same outstanding construction features and cover the same capacities as floor stands. Bench stand hoists are suitable for any installation where a convenient operating height is provided by either concrete pedestal, wall bracket or structural yoke.

Offset-type Floor Stands



The Rodney Hunt offset-type floor stand is a convenient adaptation of the conventional floor stand and can be used to advantage for many special conditions. In open tanks or channels, for example, the offset-type floor stand may reduce construction costs by eliminating the need for floor stand brackets or concrete wall supports.

The pedestals are heavily ribbed for extra strength, and are designed to offset the operating unit from the base. Except for these pedestals, the construction features and specifications are basically the same as those for other Rodney Hunt floor stands.

Where the handwheel or crank offset floor stand is used, the operating head is exactly the same as that used on the corresponding standard floor stand. The only difference between the offset floor stand and the standard floor stand is the change in the pedestal. All offset type floor stands are designed to operate the sluice gate or slide gate with a 40 lb. effort on the crank and to withstand a maximum force on the crank of 200 lbs.

Offset-type floor stands are available in all the ratios of the standard floor stands through model 5020. Offsets range from 2" to 8".



Crank operated

Single Speed
Refer to
output chart
on page 4

OS-2600
Handwheel
Operated

1:1 Ratio
Single Speed
Refer to
output chart
on page 7



Offset floor stand used in treatment aeration basin



This adjustable
OS-2600
floor stand
has a range
of 1.50" to 6.25"

Slots on top of offset floor stand make it adjustable to match stem location.

Interconnected Crank-operated Floor Stands and Bench Stands



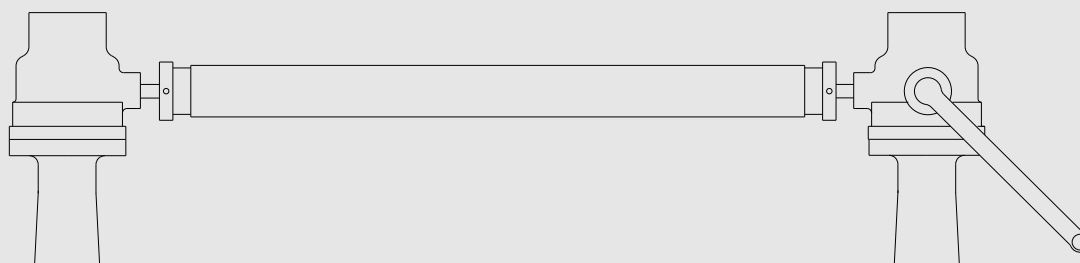
Interconnected crank-operated floor stands and bench stands, which have the advantage of being operated from either or both ends, are required for sluice gates arranged for twin stem operation.

The basic interconnected systems use floor or bench stands having ratios of 1.5:1, 2.5:1 or 4:1 for single-speed operation and 12:1, 20:1, 36:1 and 54:1 for two-speed operation.

The floor stands are interconnected by stainless steel shafting with a flexible coupling connector to the floor

shafting with a flexible coupling connector to the floorstand or bench stand pinion shafts. The floor stands or bench stands are unchanged except for the additional pinion shaft. Any number of floor stands or bench stands can be used together.

Interconnected floor stands are also available with an electric motor drive unit mounted between, or to one side of the two floor stands. A standard motor-operated actuator is used to provide emergency manual operation, and limit and torque switch protection for the interconnected arrangement.



Motor-operated Floor Stands



Motor-operated floor stands are widely used where speed and ease of operation are particularly desirable. Rodney Hunt supplies a variety of motor-operated actuators from well-known manufacturers for either standard or special uses to handle loads up to 250,000 pounds. A wide variety of control arrangements, operat-

ing stations and position-indicating components permits many possible combinations.

For more detailed information on electric motor driven actuators contact Rodney Hunt or the manufacturer direct. Catalog information detailing dimensions, design characteristics and capacities is readily available.



LIMITORQUE MOTOR-OPERATED FLOOR STAND



E-I-M MOTOR-OPERATED FLOOR STAND



ROTORK MOTOR-OPERATED FLOOR STAND



Limitorque and E.I.M. electrically operated floor stands used in typical treatment plants.



Hydraulic and Pneumatic Cylinder Operation

Hydraulic and pneumatic cylinder operation offers a number of advantages, including low power and maintenance cost, a wide range of operating speeds and good reliability. It is particularly advantageous where frequent operation of the gate is required.

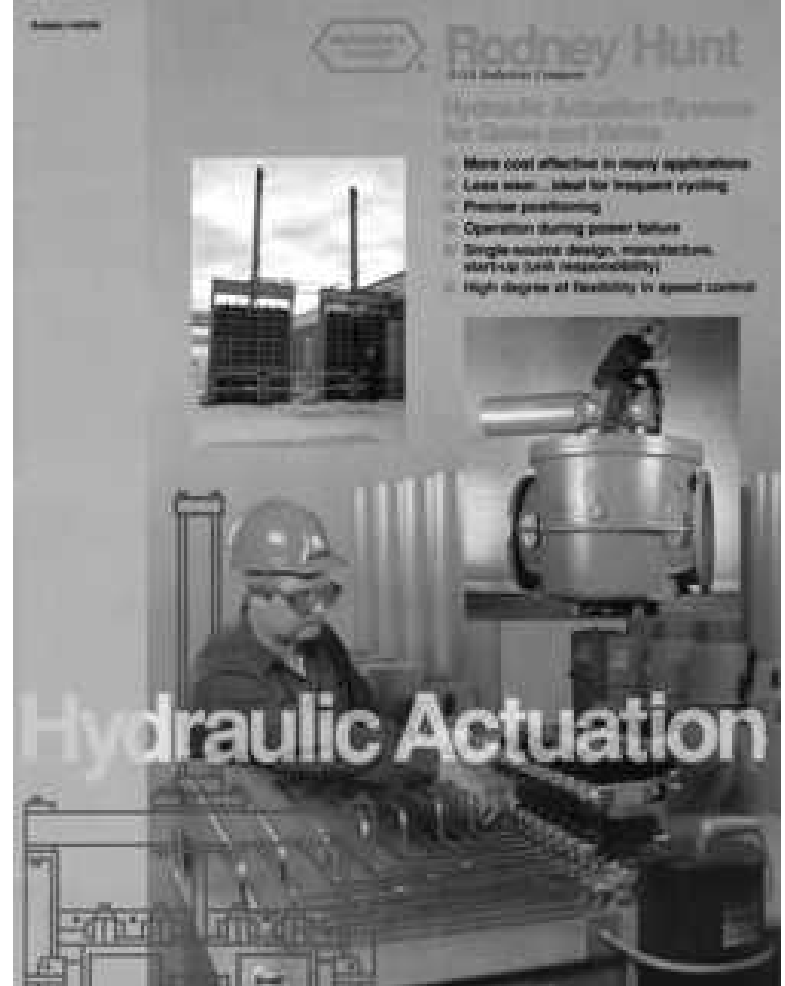
Medium and high pressure cylinders are readily available to meet the latest JIC standards. Special features such as stainless steel piston rods and special external coatings make these cylinders suitable for sewer and water plant applications. High pressure oil systems keep both cylinders and power supply units at minimum sizes and lowest costs.

Cylinders may be mounted on the yoke of the gate or independently on concrete floors or other supporting structures. Additional detailed design features, dimensions and capacities are available upon request.



Hydraulic Systems Brochure

A brochure entitled "Hydraulics Actuation" has been prepared that describes in detail the type of hydraulic systems that Rodney Hunt designs and manufactures. The brochure describes the advantages of using hydraulic systems for actuating gates. It also contains performance specifications and component specifications, engineering information for sizing systems and common questions and answers about hydraulic systems.



Hydraulic Systems



Rodney Hunt specializes in providing complete hydraulic systems to meet the desired sluice gate operating characteristics. These systems include the hydraulic cylinder, the hydraulic power unit, accumulators, and the necessary controls, and are usually furnished in self-contained units with all piping and wiring completed. The systems can range from the simple manual valve open-and-close application to the more complex system which will respond to a local or remote sensing device or signal. Systems can be supplied for electric or pneumatic control valve operation. Rodney Hunt will furnish upon request system description, specifications and piping diagrams to meet the requirements of the application.

The hydraulic systems furnished by Rodney Hunt fall into three general operating modes as follows:

A typical **MANUAL SYSTEM** includes equipment to manually open, close or position the sluice gate. It includes reservoir, filter, motor driven hydraulic pump, pressure switch and pressure relief valve. A manually operated directional valve actuates the cylinder.

Options:

1. A solenoid operated directional valve with local and/or remote control stations.
2. A handpump with separate valving for emergency operation in the event of power failure.
3. Local or remote gate position indication.

Typical Applications:

Replaces manual actuator or push-button electric actuator. Any application where automatic operation is not necessary, but where local or remote opening, closing or positioning is desired.

A typical **FAIL-SAFE SYSTEM** includes the features of the MANUAL system with the additional capability to open or close the gate automatically after electric power failure. This is accomplished by stored hydraulic pressure in accumulators.

Options:

1. Open or close the gate automatically when the water level exceeds a given elevation.
2. Open or close the gate automatically when there is dangerous gas level detection.
3. Move the gate to a predetermined intermediate position in the event of electric power failure or other emergency conditions.

Typical Applications:

Provides opening, closing or positioning of sluice gates in the event of power failure in sewage and water treatment plants or pump stations.



One of the many hydraulic control systems designed by Rodney Hunt to control the operation of gates.

A typical **MODULATING SYSTEM** contains the features of the MANUAL and FAIL-SAFE systems with the additional capability to modulate the gate in response to a signal which is proportional to the flow or level of the liquid.

Options:

1. Respond to level or flow sensing devices furnished by Rodney Hunt.
2. Interface with a computer regulated system.
3. Interface with other complex regulating systems.

Typical Applications:

Allows for modulation of the gate in response to a signal. Typical uses would be to maintain the level in an aeration tank; splitting the flow between two sections of a sewage plant; maintaining a level in a pump station wet well or influent channel under varying flow or head conditions; in combined sewage regulation, in regulating the flow to the sewage treatment plant or directing flow to a storm sewer storage system.

Portable Operators



Portable operators offer the advantages of convenience, ease and speed of operation. Where sluice gates are scattered throughout a wide area, the portable operator can be transported from one place to another. In cases where there is infrequent operation of the gates, one portable operator can be used instead of using electric motor driven operators or actuators on all gates. Rodney Hunt has two types of portable operators: the electric drill type mounted on a tripod and the hydraulic type mounted on a two-wheel cart. Either of these operators can be used for the full range of manually operated sluice gates or slide gates.

Tripod-type

Rodney Hunt tripod mounted portable operators may be electrically operated (Model 15PO) or air operated (Model 18PO) with reversing features and an overload release clutch for the protection of the operated equipment. The Model 15PO operates from a 110 volt, single phase power supply. The on-off switch must be held in during operation. When released the drive unit stops.

The tripod is of lightweight construction, adjustable to vary the height of the output shaft to coincide with the input pinion shaft of the actuator to be operated.

The overload release clutch is of the spring loaded, drive-pawl type which releases instantly at preset, predetermined torque. Disc friction clutches or shear pins are not used.



Hydraulic-type

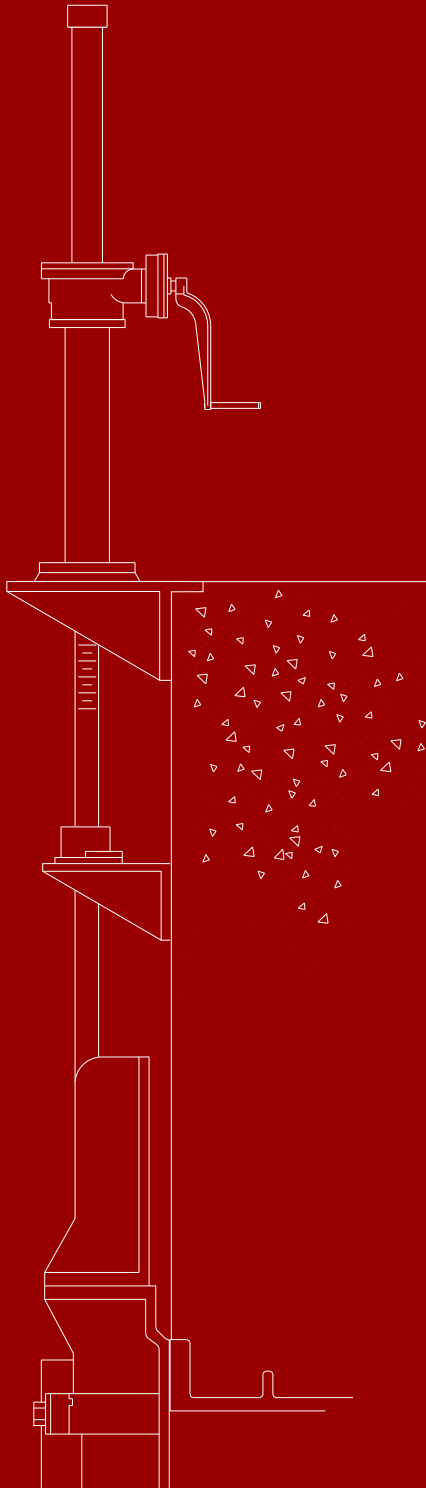
The Rodney Hunt hydraulic type portable operator is mounted on a lightweight structural steel frame with two wheels for ease of movement. The unit consists of a four-cycle gasoline engine with a recoil starter, driving a hydraulic pump. An engine governor and relief valve on the pump limit the hydraulic drive output to 50 ft. lbs. of torque at 120 rpm. The pump delivers oil through a fourway valve which is used to control the direction of rotation of the hydraulic motor. The hydraulic motor mounts to the pinion shaft of the actuator. Flexible hoses connect the four-way valve to the hydraulic motor. The hydraulic fluid is stored in a reservoir with a level gauge, drain plug and indicating type filter. It is a compact, easily handled unit suitable for any type of geared sluice gate actuator.



Hoist Accessory Equipment

Long, trouble free performance of a gate and hoist installation depends on the quality of the accessory equipment which is used. These accessories include operating stems, stem couplings, stem guides, stem covers, wall brackets, handwheels, cranks and stem stuffing boxes.

All Rodney Hunt accessory equipment is of the same high quality as the sluice gate and actuator.



Stems

Rodney Hunt stems are used to operate cast iron, bronze mounted sluice gates, fabricated metal gates and timber gates. They are normally stainless steel. The threaded stems have accurate machine cut threads of the 29° acme type. All Rodney Hunt stems are sized to withstand the expected output of the actuators with which they are used.

STEM TABLE

STEM DIAMETER INCHES	NUMBER ACME THREADS PER INCH	WEIGHT OF STEM LBS./LINEAR FOOT STAINLESS STEEL
1	4	2.67
1 1/8	4	3.38
1 1/4	4	4.17
1 1/2	3 1/2	6.01
1 3/4	3 1/2	8.18
2	3	10.68
2 1/4	3	13.52
2 1/2	3	16.69
2 3/4	2 1/2	20.19
3	2 1/2	24.03
3 1/4	2	28.21
3 1/2	2	32.71
3 3/4	2	37.55
4	2	42.73
4 1/4	2	48.23
4 1/2	2	54.08
4 3/4	2	60.25
5	2	66.76



Stem Couplings

Stems are often required in long lengths and, for convenience of handling and installation, several lengths may be coupled together. High tensile strength bronze couplings are internally threaded and keyed to match the stem end threads. A set screw locks the key in place. All couplings of the same size are interchangeable.



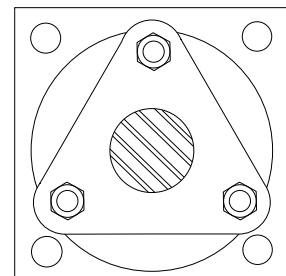
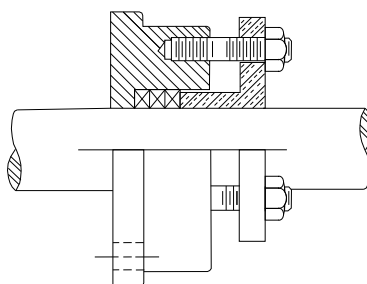
Stem Guides

To limit the l/r ratio to less than 200 or where required for good design, stem guides are provided for intermediate stem support. The cast iron guide with bronze bushing, is mounted on a cast iron bracket attached to the wall. The guide and bracket provide adjustability in two directions. The inside diameter of the guide is 1/16" larger than the stem diameter to provide close support. For ease of installation, Rodney Hunt provides a two-piece stem guide which can be installed after the stem is in place.



Hoist Accessory Equipment

When the gate operating mechanism or intermediate concrete floors are located below water level, it becomes necessary to install a water-tight seal around the sluice gate operating stem. Rodney Hunt has many available designs of watertight and gas tight stem stuffing boxes.



Wall Brackets

Cast-iron wall brackets are used to support floor stands or bench stands when no concrete work or suitable floor exists in the area where the stand is to be mounted. Rodney Hunt wall brackets are designed to effectively withstand all normal operating loads and are attached, with anchor bolts, to the vertical face of the concrete wall directly above the gate.



Handwheels and Cranks

Rodney Hunt cranks are cast aluminum with rotating bronze grip, and are available in 8", 12" and 15" sizes. Cast aluminum handwheels offer high strength and light weight for easy operation of floor stands or bench stands. They are easily removable to prevent unauthorized operation and are not subject to breakage if dropped. Handwheels are stocked in diameters of 12", 16", 18", 24" and 30".

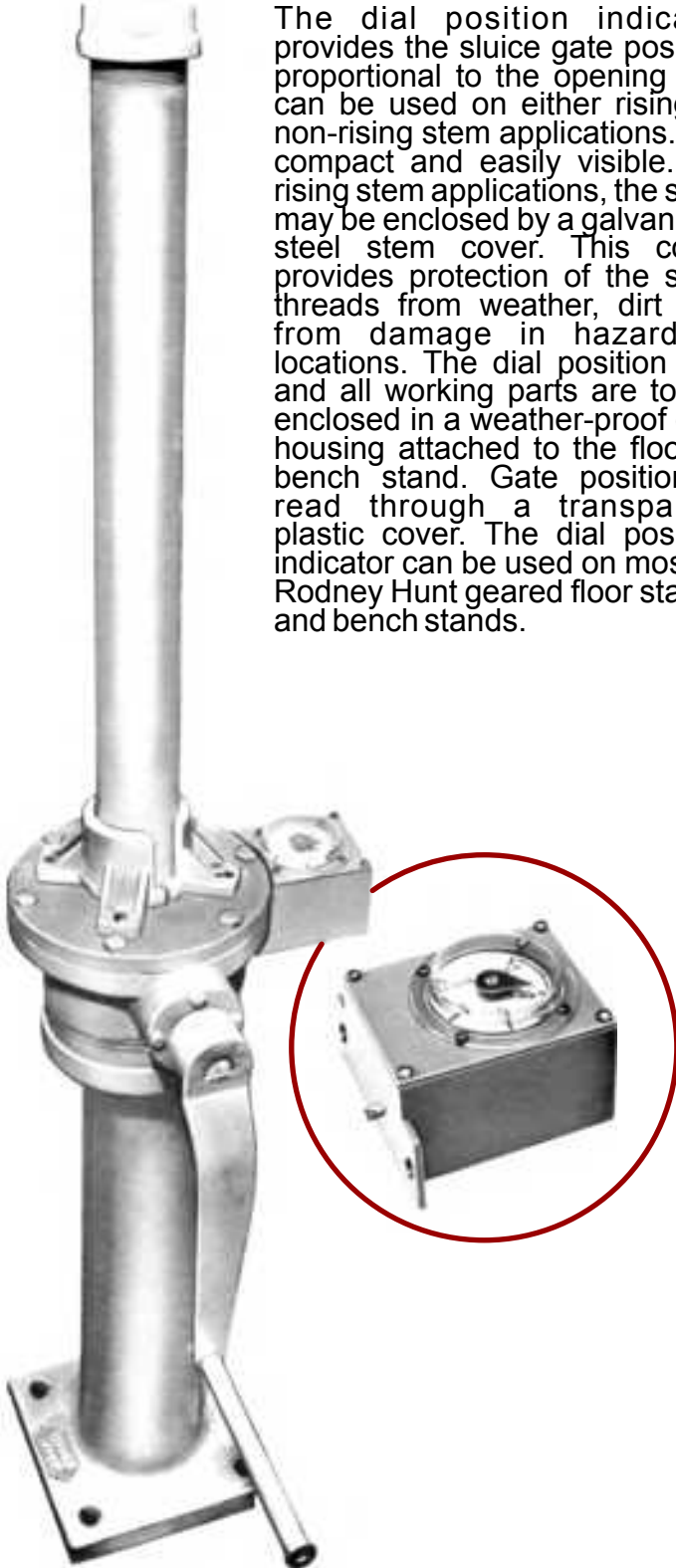


Stem Covers and Position Indicators



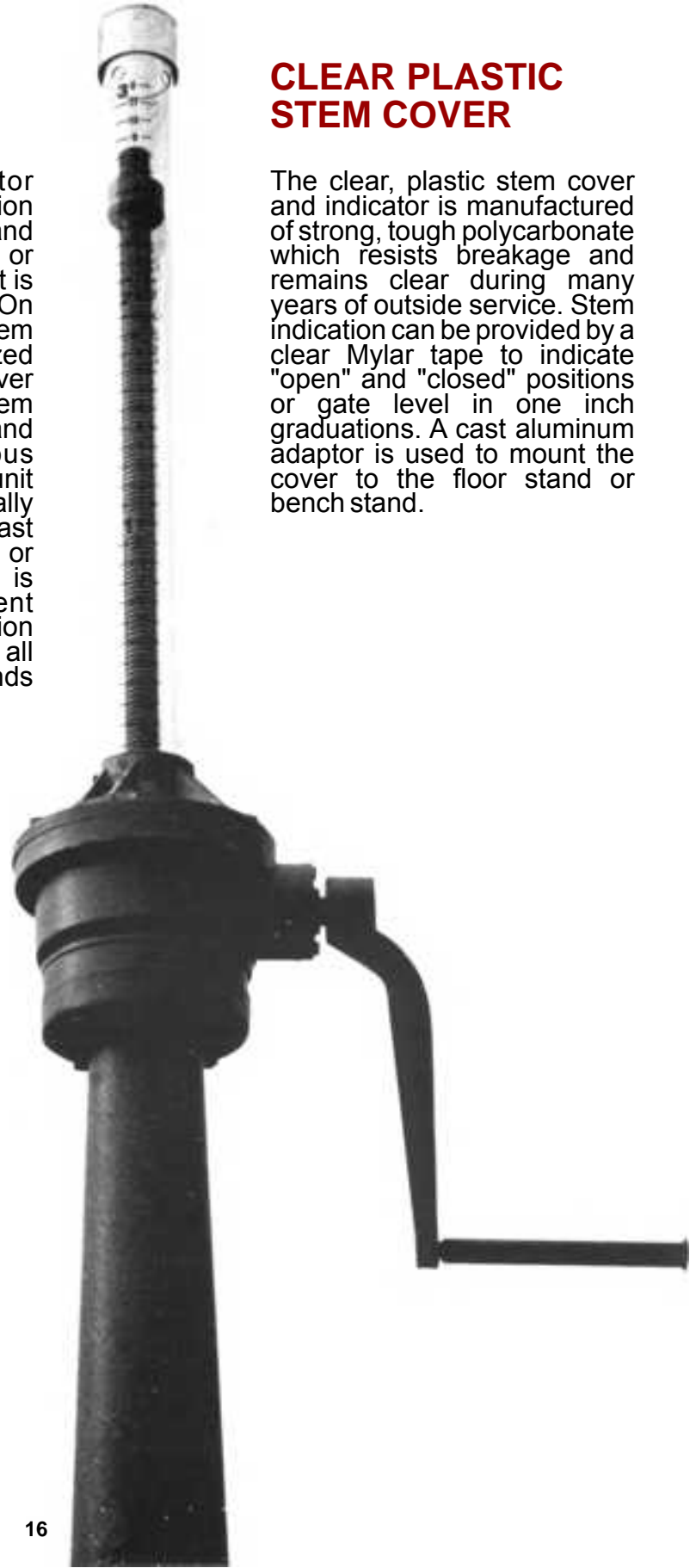
DIAL POSITION INDICATOR WITH GALVANIZED STEEL COVER

The dial position indicator provides the sluice gate position proportional to the opening and can be used on either rising or non-rising stem applications. It is compact and easily visible. On rising stem applications, the stem may be enclosed by a galvanized steel stem cover. This cover provides protection of the stem threads from weather, dirt and from damage in hazardous locations. The dial position unit and all working parts are totally enclosed in a weather-proof cast housing attached to the floor or bench stand. Gate position is read through a transparent plastic cover. The dial position indicator can be used on most all Rodney Hunt geared floor stands and bench stands.



CLEAR PLASTIC STEM COVER

The clear, plastic stem cover and indicator is manufactured of strong, tough polycarbonate which resists breakage and remains clear during many years of outside service. Stem indication can be provided by a clear Mylar tape to indicate "open" and "closed" positions or gate level in one inch graduations. A cast aluminum adaptor is used to mount the cover to the floor stand or bench stand.



Hoist and Stem Selection Guide



The information contained in this section has been included to give you direction and guidance in selecting hoist and stem systems for your specifications. However, other variables must be considered and final hoist selection and stem design will be made by the Rodney Hunt engineering department.

CALCULATION OF FORCE REQUIRED TO OPEN A SLUICE GATE

1. **F(water)** - Force required to overcome the friction component of the water load:

$F(\text{water}) = (f) (H) (w) (A)$
 $f = 0.35$ - coefficient of friction
 H = head at centerline of gate in feet
 $w = 62.4$ lbs/cu.ft. - density of water
 A = area of opening in square feet = width x height (use the square opening area for circular gates)

2. **F(weight)** - Force required to raise the dead weight of the system:

$F(\text{weight}) =$ approximate disc weight plus approximate stem weight

Approximate stem weight is calculated from assumed diameter, assumed length, selected material and weight per foot from Stem Table on page 15. Approximate disc weight is selected or estimated from the table below.

3. **Force to open sluice gate = F(water) + F(weight)**

FORCE TO OVERCOME FRICTION (LBS.)									
$F(\text{water}) = (H) (62.4) (A) (0.35)$									
GATE SIZE		AREA = A Ft. ²	HEAD IN FEET = H						
WIDTH	HEIGHT		5	10	20	30	40	50	60
6	6	0.3	30	55	110	165	220	275	330
12	12	1.0	110	220	440	655	875	1090	1310
16	16	1.8	195	390	775	1170	1550	1940	2330
18	18	2.3	245	490	985	1470	1970	2460	2950
20	20	2.8	300	610	1210	1820	2430	3030	3640
24	24	4.0	440	875	1750	2620	3490	4370	5240
24	36	6.0	655	1310	2620	3930	5240	6550	7860
30	30	6.3	680	1370	2730	4100	5460	6830	8190
36	36	9.0	985	1970	3930	5900	7870	9830	11790
36	48	12.0	1310	2620	5240	7860	10480	13100	15730
36	60	15.0	1640	3280	6550	9830	13100	16380	19660
42	42	12.3	1340	2680	5350	8030	10700	13380	16050
48	48	16.0	1750	3490	6990	10480	13980	17470	20970
48	60	20.0	2180	4370	8740	13100	17470	21840	26210
48	72	24.0	2620	5240	10480	15730	20970	26210	31450
54	54	20.3	2210	4420	8850	13270	17690	22110	26540
60	60	25.0	2730	5460	10920	16380	21840	27300	32760
60	72	30.0	3280	6550	13100	19660	26210	32760	39310
60	84	35.0	3820	7640	15290	22930	30580	38220	45860
66	66	30.3	3300	6610	13210	19820	26430	33030	39640
72	72	36.0	3930	7860	15730	23590	31450	39310	47170
72	84	42.0	4590	9170	18350	27520	36690	45860	55040
72	96	48.0	5240	10480	20970	31450	41930	52420	62900
84	84	49.0	5350	10700	21400	32110	42810	53510	64210
96	96	64.0	6990	13980	27960	41930	55910	69890	83870
96	108	72.0	7860	15730	31450	47170	62900	78620	94350
96	120	80.0	8740	17470	34940	52420	69890	87360	104800
108	108	81.0	8850	17690	35380	53070	70760	88450	106140
120	120	100.0	10920	21840	43680	65520	87360	109200	131000
132	132	121.0	13210	26430	52850	79280	105700	132100	158600
144	144	144.0	15730	31450	62900	94350	125800	157200	188700

APPROXIMATE SLUICE GATE DISC WEIGHT IN POUNDS (use in determining F (weight))					
OPENING W x H	DISC WEIGHT	OPENING W x H	DISC WEIGHT	OPENING W x H	DISC WEIGHT
6 x 6	37	24 x 60	970	54 x 54	2184
8 x 8	48	30 x 30	500	54 x 60	2325
10 x 10	54	30 x 36	510	54 x 72	2900
12 x 12	110	30 x 48	680	60 x 60	3450
12 x 18	130	30 x 60	1094	60 x 72	3650
12 x 24	156	36 x 36	625	60 x 84	3900
14 x 14	98	36 x 42	760	60 x 96	4900
15 x 15	120	36 x 48	900	66 x 66	3600
16 x 16	136	36 x 60	1504	72 x 72	4800
16 x 24	166	36 x 72	1857	72 x 84	6000
18 x 18	187	42 x 42	850	72 x 96	6270
18 x 24	216	42 x 48	1480	78 x 78	5000
18 x 30	260	42 x 60	1714	84 x 84	6750
18 x 36	395	42 x 72	2500	84 x 96	7650
20 x 20	195	48 x 48	1272	96 x 96	9000
20 x 24	220	48 x 54	2240	96 x 120	10600
24 x 24	344	48 x 60	2125	108 x 108	9640
24 x 30	385	48 x 72	2700	120 x 120	14500
24 x 36	502	48 x 84	2820	132 x 132	16500
24 x 48	647	48 x 96	3680	144 x 144	19900

Preliminary Hoist-Stem Design

The calculated force required to open the sluice gate and the stem diameter determines the floor stand or bench stand to be specified. The following table below (or the output tables on pages 5, 7 and 8) can be used for preliminary hoist selection.

FORCE TO OPEN LBS.	FLOOR OR BENCH STAND	TYPE/SPEED	MAX. STEM DIA.
0 to 3800	2600	H.W./single	2"
0 to 4000	5001.5	crank/single	1 1/2"
0 to 7000	5002.5	crank/single	2 1/4"
4000 to 10000	5004	crank/single	3 1/4"
9000 to 28000	5012	crank/two	3 1/4"
27000 to 39000	5020	crank/two	3 1/4"
37000 to 57000	5036	crank/two	4"
57000 to 85000	5054	crank/two	4"



Important Consideration in Stem Design:

All Rodney Hunt stems are designed to withstand in compression at least twice the output of the actuator with a 40 lb. effort on the crank or handwheel. Where the gates are operated with electric motor driven actuators, the stems are designed for 1.25 times the stalled output of the electric operated actuator. Where the gates are operated by hydraulic cylinders the stems are designed to withstand 1.25 times the output of the cylinder with the pressure at the pressure relief valve setting. These forces may be several times greater than the normal force required to operate the gate.

The force necessary to operate the gate can be calculated as shown on Page 17. This force is used to select the proper handwheel or crank operated actuator. It is also used to size the electric actuator or the hydraulic cylinder. Once the proper actuator has been selected then the output of the actuator determines the size of stem.

The maximum allowable compressive load on the stem is calculated using Euler's long column formula where the l/r ratio is between 100 and 200. Stem guides are used to maintain an l/r ratio of 200 or less.



Operation and Maintenance of Hoisting Equipment and Stems

All handwheel and crank operated floor stands and bench stands are lubricated at the factory. They are provided with grease fittings, and at least once a year should be lubricated with a small amount of heavy duty grease which will not harden in cold weather nor become liquid in warm weather. The following lubricant is recommended:

Mobilgrease Special

Mobilgrease Special It is essential that the operating stems be cleaned and lubricated at least every six months. Where dusty conditions prevail or where the threaded section of stem becomes coated with debris more periodic cleaning and lubricating will be necessary. Difficult operation and accelerated wear of the stem and operating nut can result if good cleaning and lubricating are not maintained. Stems should be lubricated with a high grade, heavy duty lubricant, such as:

Shell Alvania 2 EP

Tycol Azepro 2

Mobilox Grease 2 EP

Valvoline Val-Lith 2 EP

Electric motor actuators, hydraulic cylinders and hydraulic equipment, portable operators and other equipment should be maintained in accordance with the Operations and Maintenance Manuals which accompany this equipment.