

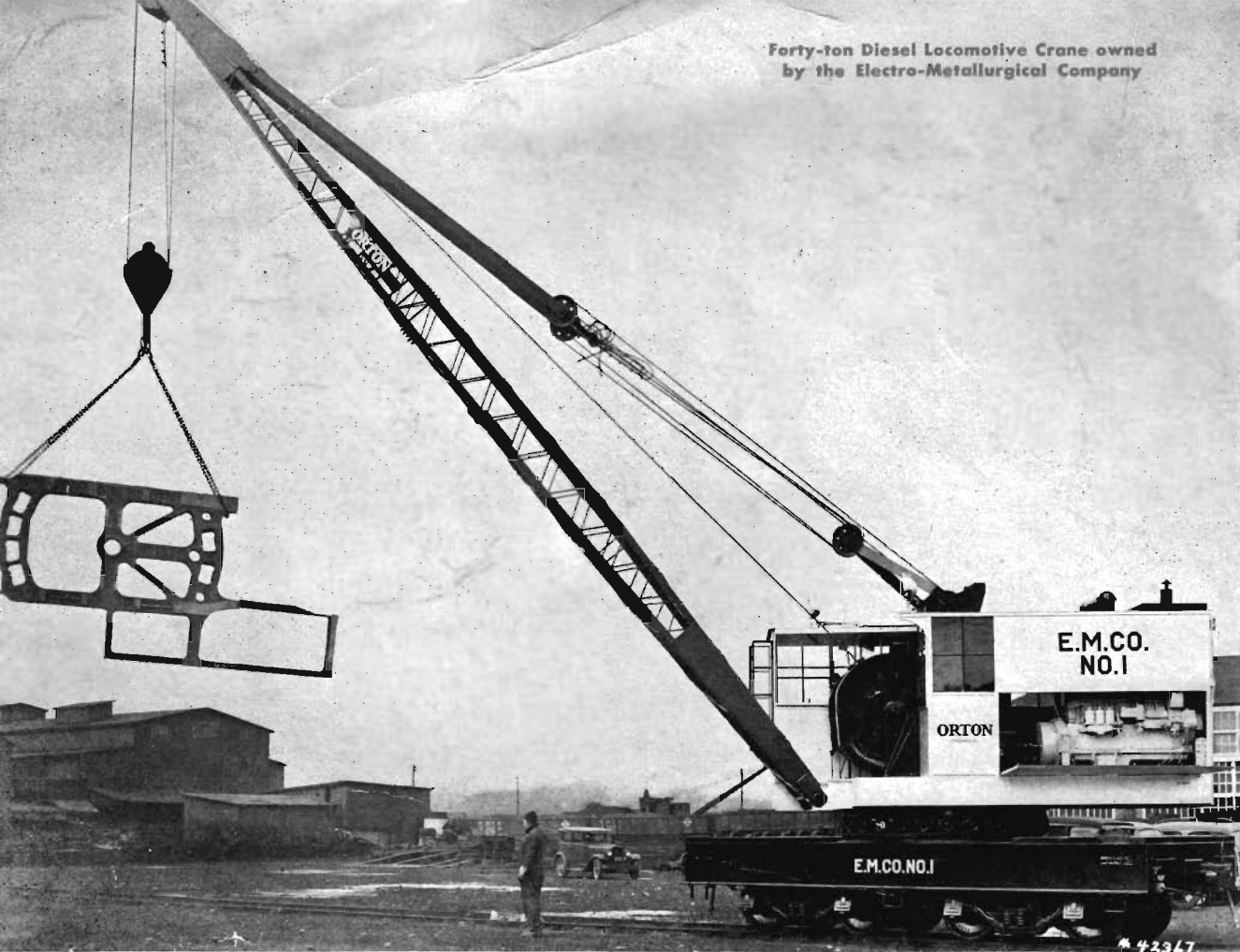
ORTON CRANES

LOCOMOTIVE AND TRUCK TYPES



LUBRICATION INSTRUCTIONS

Forty-ton Diesel Locomotive Crane owned
by the Electro-Metallurgical Company



Model 8 Gasoline Driven Pneumatic-
Tired Crane with 40 ft. boom —
supplied to French Supply Council.



I N T R O D U C T I O N

Orton locomotive and truck cranes are individually engineered and precision built to high mechanical standards. They are designed to handle maximum loads continuously on a 24 hour basis with economy of fuel and a minimum of maintenance. Because Orton equipment is used out-of-doors is no reason to consider it in a class with certain types of crude heavy machinery. Such equipment is designed primarily to withstand abuse. Efficient transmission of power is not an important consideration.

In fact, Orton cranes must be given the same care and lubrication that any other piece of high quality machinery requires. In our machines where power on a sizeable scale is being transmitted, lubrication becomes of special significance. It often spells the difference between good and poor fuel consumption, between maximum and indifferent daily output and between high and low maintenance costs. In simple words, lubrication must be right for the crane to perform right.

Our purpose, therefore, in preparing this booklet is to acquaint Orton users with the specific lubricating needs of their equipment and to help them maintain lubrication on the most effective basis. The practice of correct lubrication involves the proper technique in applying lubricants, the right application intervals to prevent parts running dry and the use of oils and greases best suited to the service involved. Lubricants made by the Socony-Vacuum Oil Co., Inc., are recommended for the various requirements of Orton cranes. These products are fully dependable and their use will help to assure good lubrication.

We urge every owner to keep the subject of lubrication actively in mind. Frequently there are unnoticed opportunities to improve performance and economy through better lubrication. A careful study of the instructions presented on following pages may often lead to tangible gains and increased satisfaction.

ORTON CRANE & SHOVEL COMPANY
Chicago, Illinois

Orton System of Lubrication

Simplicity

This is a feature which has been achieved through close study of practical operating demands. No complicated oiling devices are used at any point. The dangers inherent in damage or breakage of appliances for introducing the lubricant have been minimized. Bearings are, with minor exception, lubricated by grease gun through pressure fittings. The friction screw is equipped with a housing and designed for packing with grease. Transmission gears and those of the boom hoist are lubricated by oil splash with provision for checking the level within the gear housing. Other gears are run open and lubricated by manual application. The entire design offers simple, fool-proof methods which assure dependable application of lubricant for the life of the crane.

Accessibility

A point which many manufacturers are prone to overlook is that lubrication points must be made

accessible to insure regular and sufficient application of the lubricant. If an operator has to stand on his head in order to introduce grease to a particular bearing, the chances are that bearing will run dry most of the time. Bearings on Orton cranes which are not directly accessible, are equipped with leads which bring the pressure fitting within easy reach of the operator. Gear housings are provided with convenient, accessible means of determining the oil level, of adding more oil when required and for making complete oil changes by draining and flushing.

Reliability

Delivery of lubricant to the wearing surfaces in reliable fashion is necessarily a significant item in securing good lubrication. The grease pressure system as used by Orton enables the operator to fully fill the bearing and to force some of the old grease out at the bearing ends. There need never be any doubt as to whether fresh lubricant

is arriving at the desired spot. Furthermore, the fact that grease will remain in the bearing housing for long periods assures some lubrication even if application should be irregular. Through splash

lubrication of the heavily loaded gears, oil delivery starts just as soon as the gears commence to revolve. A copious supply is assured at all speeds as long as correct oil level is maintained.

Practical Oiling Suggestions

Run-in

The care taken with the crane during the first days of operation will have an important effect upon the ultimate service obtained. The first two weeks or at least 100 operating hours, are critical in this respect because bearing and gear surfaces are burnishing and taking on a running finish. The crane should be initially started up on light loads and slow speeds with a gradual increase until rated capacity is reached. Signs of heating should be watched closely as these indicate high metallic friction. If heat becomes excessive, reduce speeds and loads until the condition improves.

A copious supply of lubricant is desirable for plain bearings during run-in. More frequent oiling and greasing than normally recommended is advisable. Transmission gears and boom hoist worm should be drained after the first 50 hours after which the normal drain periods should be followed.

The importance of careful run-in applies with special emphasis to the main driving engine. Speeds and loads should be stepped up gradually. Avoid maximum loading for at least the first two weeks. The crankcase should be drained after the first 50 hours. Thereafter adhere to regular recommended intervals of 250 hours.

Loads

The severity of loading must be given due consideration in keeping crane parts well lubricated. When the crane is continuously loaded to maximum capacity, the function of lubrication is more critical than when service is light or intermittent. Scoring or damage to wearing surfaces can occur very quickly under heavy loads. Lubricant recommendations on chart page 11 should be carefully followed. It is usually desirable to lubricate bearings more often and to make certain all other parts are amply provided with lubricant.

Dust and Dirt

Anyone familiar with the conditions under which locomotive cranes are operated will realize

that the air is likely to be heavily dust laden and that dirt and grit will constantly tend to collect on all exposed surfaces. Furthermore, this abrasive material may penetrate to the rubbing surfaces of bearings and enclosed gears unless due precautions are taken to prevent their entrance. Pressure fittings, filler openings, oil holes, etc., should be wiped clean before oil or grease is applied. Teeth of open gears and surfaces of cables, drum faces and sheave blocks should be kept free of dirt. When plain bearings are kept well filled, the grease acts as a seal to exclude dirt from internal surfaces. Fresh grease should be pumped in until some of the old shows at the bearing ends. By so doing, most of any grit which has entered will be flushed out.

Lubricants should preferably be stored in a clean, isolated location and not in the crane cab. Keep lubricant containers closed when not in use and endeavor in every way to eliminate the possible entrance of abrasive matter during storage and dispensation.

Weather Conditions

Generally speaking, the weather presents no great difficulty in maintaining proper lubrication if ordinary common sense is exercised. When the crane mechanism is thoroughly chilled during over-night shut-down in winter, it is advisable to limber up slowly in the morning so as to give the oil and grease a chance to distribute before applying load. Lubricants should be used which retain some degree of fluidity at the lowest temperatures encountered.

Water in the form of rain, snow, mist, etc., tends to restrict or defeat the action of the lubricant and should be guarded against as much as possible. It also accelerates the formation of rust on unprotected metallic surfaces. In the case of parts such as wire ropes and cables, corrosion is particularly damaging to service life. Therefore, when there is a possibility of water entering it is desirable to keep such points liberally supplied with lubricant.

Routine

The regularity and thoroughness with which the lubricant is applied to all parts is an important consideration. First of all, the operator or oiler should have a complete knowledge of the crane's requirements, the location of all lubrication points, type of lubricant necessary and the correct interval of application. The number of grease fittings, oil holes, etc., should be memorized in order

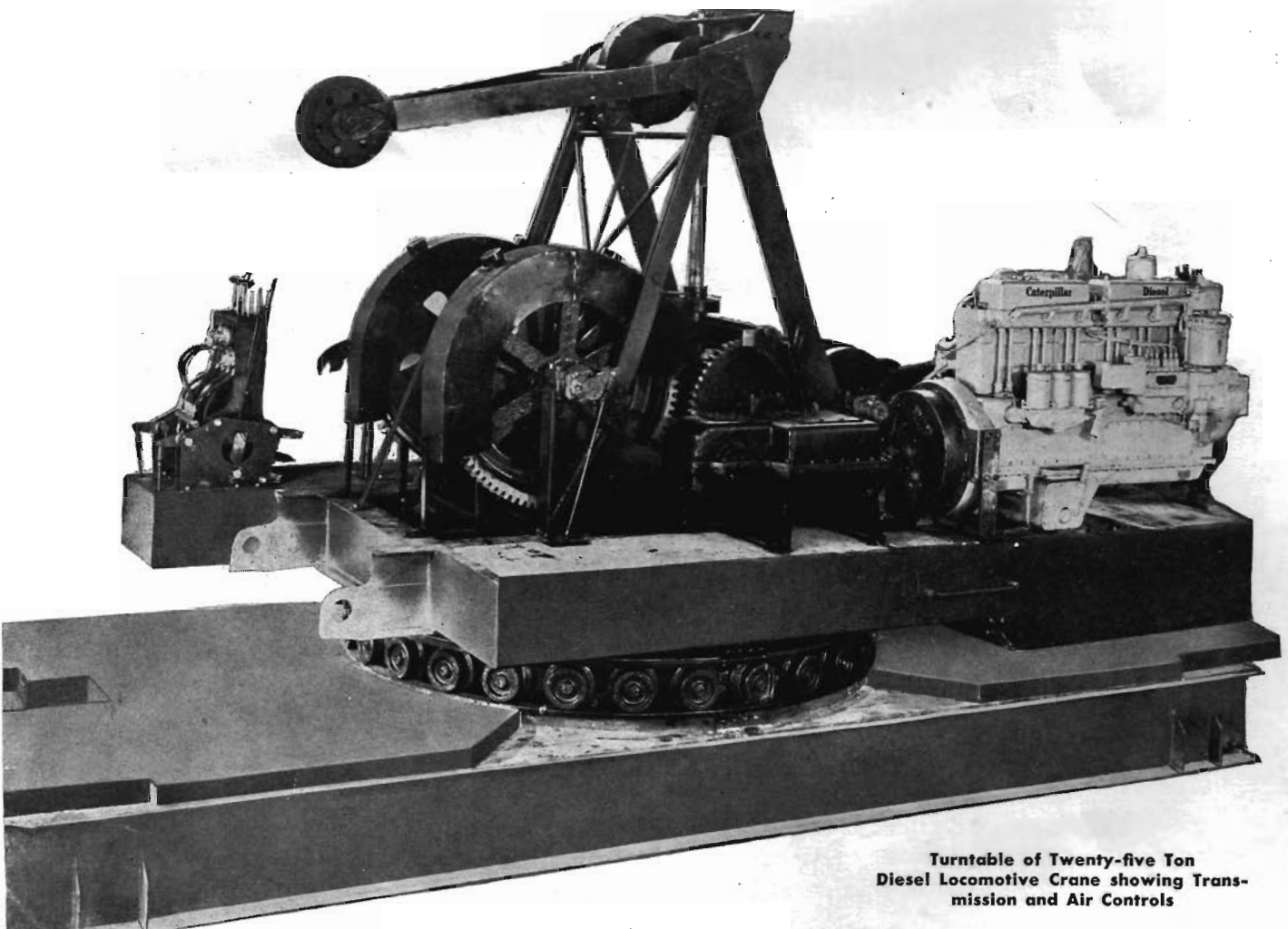
that no points may be neglected. Finally, the recommended interval should be faithfully observed and adequate amounts of lubricant introduced to avoid the possibility of parts running dry. Never over-oil with the idea of doing so less often, as the excess lubricant will simply go to waste and scoring may occur if interval is prolonged. Records covering dates of oil changes will help to promote regularity of attention.

Bearing Lubrication

All bearings are equipped for grease lubrication except in the case of certain minor points which are provided with oil holes and felt pads. Introduction of grease is obtained by pressure gun and fittings. In the case of inaccessible bearings, leads

are installed which permit the fittings to be placed within easy reach of the operator.

Both plain and anti-friction bearings are employed, the former being fitted with interchange-



Turntable of Twenty-five Ton Diesel Locomotive Crane showing Transmission and Air Controls



Seven-ton Gasoline-operated Crane-truck
owned by Grasselli Chemical Company

able bronze bushings and the latter being mainly of the heavy duty ball bearing type. The choice between plain and anti-friction bearings is largely controlled by cost and service conditions. In general, slow speeds and heavy shock loading favor the plain sleeve type.

How Often to Lubricate

Plain bearings require more frequent lubrication than ball bearings. Usually an application of grease or oil is needed at least once each 8 hour shift. In the case of hard working parts, it may prove desirable to lubricate more often. For plain bearings, frequent application in normal amount is always better than greater quantities at longer intervals because the lubricant is constantly being squeezed out or runs to waste. In addition, when bearings are kept full of grease, they are sealed against penetration of dust and dirt. When greasing plain bearings, make certain to apply gun until some of the old grease shows at the bearing ends.

Anti-friction bearings require much less grease than the plain type. In fact, sparing application once monthly is all that will usually be necessary. Never fill the bearings under high pressure by repeated application of the gun because this practice may damage the seals, cause the bearings to run hot and induce premature failure. Whenever anti-friction bearings are taken down for maintenance purposes, it is suggested that all the old grease be removed, the bearing elements washed in solvent and then repacked with fresh grease.

Use General Purpose Heavy Duty Grease

For normal conditions of operation, a high quality grease suitable for both plain and anti-friction bearings should be employed. A grease of the heavy duty (leaded) type is preferred as it gives better protection against the fluctuation in loads normal to crane operation. Medium con-

sistency is suggested, suitable for grease gun application to all types of bearings.

Bearings having oil holes should be lubricated with a heavy bodied bearing oil or general purpose lubricant for use on cranes.

Sheave Blocks

Bearings of sheave blocks frequently give trouble due to lack of lubricant. These should be greased regularly at least once each 8 hour shift. Apply plenty of grease and lubricate more often if conditions demand.

Oiling of Gears

Continuously efficient transmission of power from the engine to the bucket is greatly influenced by the care given to gear lubrication. Wear and power loss through friction will be relatively high when gears are not properly oiled. The transmission gears and boom hoist worm gear have oil-tight housings and are lubricated by splash. Other gears run open or have partial enclosures and are intended for manual application of the lubricant.

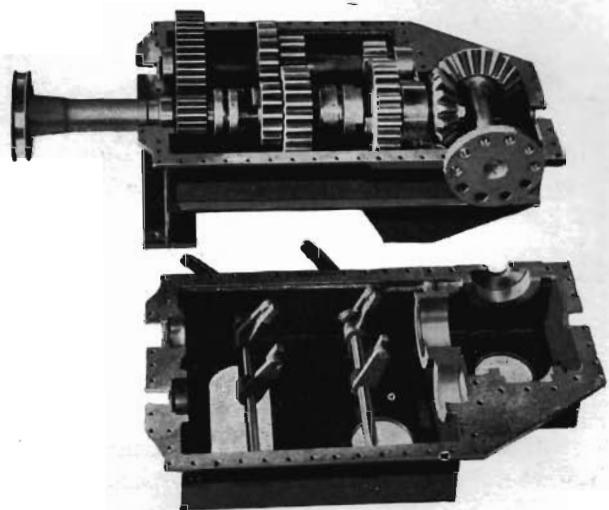
Use Leaded Oils for Transmission Maintain Proper Oil Level Change Oil Every Six Months

The above headings summarize the pertinent instructions for oiling enclosed gears. Due to the shock loads which must be absorbed by the gears in all crane service, lubricants containing lead compounds are recommended for the transmission. This type of gear oil has been found to offer the greatest protection against scoring and to keep wear at the lowest level. Heavy body or viscosity is desirable but the oil should, at the same time, be light enough to assure sufficient splash to all internal bearing and tooth surfaces. Quality is of particular importance because the oil must stand up dependably for reasonable periods under severe churning and without marked tendency to lose the lead compound or form deposits. The boom hoist worm gear should also be filled with a leaded oil of the same grade as employed in the transmission.

Maintaining the correct level is of parallel significance in obtaining most effective lubrication. If the level is permitted to fall below the danger point, partial or complete starvation of the rubbing surfaces will occur, with the prospect of quick damage to the gear teeth. We urge that oil levels be checked regularly at least once each 8 hour shift, and fresh oil added as needed to maintain level at high or full mark. This should be done

when gears are idle in order that a true reading may be obtained. A gauge is provided on each gear housing for quickly and conveniently determining the height of the oil. Over-filling or raising the level beyond the prescribed height will serve no good purpose and in fact may cause heating and power loss due to excessive churning. The transmission particularly should not be filled beyond the correct oil level as trouble with case leaking will usually occur if the level is raised beyond normal.

The gear cases should be drained and refilled with fresh oil every six months or 1500 hours of operation. This interval is suggested for average conditions when oil of good quality is employed. In the event loading and service is severe, it may prove desirable to shorten the interval somewhat in order to assure the desired protection to the gear teeth. The oil will gradually suffer deterioration as a result of service and may also pick up contaminants in the form of moisture, dust and fine metal particles. Regular oil changes are, therefore, highly essential to good lubrication.



Transmission with case opened

Open Gears Require a Tacky Lubricant

Open gears and pinions or those not provided with an oil-tight enclosure should be lubricated with an adhesive, tacky product or 'gear shield' which needs some heating for easy application. A lubricant which has been rendered fluid by the addition of a solvent may also be used if oiling routine can be so arranged as to permit at least four hours for evaporation before crane is started up. In many instances, this type will be found a convenience as no prior warming is required. Except in the case of extremely dusty conditions, grease is not recommended for these gears as

even the most adhesive types have a greater tendency to ball up and throw off as compared with viscous mineral products.

The tooth surfaces should be lubricated at least once weekly by brush or swab or other suitable means. If the crane is working longer than eight hours daily, more frequent application will usually be needed. This must be left to the good judgment of the operator. Before a fresh coating is applied, make certain to remove any evidence of accumulated dirt and grit from the gear teeth. It is advisable to apply a light layer on *all* the contact areas and not depend upon the movement of the gears to distribute the lubricant.

Wire Ropes and Cables

Periodic cleaning and lubrication of wire ropes and cables will materially lengthen their useful life and also insure freer movement over pulleys, sheave blocks and drums. Many operators are not aware of this fact or choose to lose sight of it altogether and as a result are severely penalized by early need for replacement. All cables except those which are pulled through dirt, work much better when regularly lubricated.

Although some operators may prefer to use heavy viscous products, the best long term results generally speaking will be secured with oils that are sufficiently fluid to penetrate and so provide

lubrication to internal surfaces. A general purpose bearing oil will be suitable for this requirement, or if desired, the same oil as used in engine may be employed.

Just how often the cables should be lubricated and by what method is a matter which must be determined by requirements of the work and judgment of the operator. Once weekly can be considered an average interval. Cleaning off dirt with a rag prior to oiling will be helpful. Application with brush or swab is common although there are certain oiling devices designed for cable lubrication which may be found a convenience.

Friction Screw

On both the sluing shaft and hoisting drum shaft, a friction screw is used to provide positive locking action. The screw enclosure should be kept filled with lubricant, otherwise wear will be high and early replacements necessary. A high quality heavy duty grease of medium consistency is recommended. Under severe conditions of operation, it is frequently desirable to use white lead mixed with the grease. The quantity of white lead to use can best be determined by experimenting under the particular conditions of service. The screw should be replenished with grease at least

once weekly. After filling, always make certain that lid is replaced in order to exclude dust and dirt.



Swing Shaft with "T" Type Clutches and Renewable "Orcoin" Friction Blocks. (Shows friction screw with ballnut removed.)

Engines and Electric Motors

Four types of power units are available for Orton cranes, namely, Diesel, gasoline, electric or steam. Present-day demand largely favors the Diesel or gasoline engine and the great majority of our machines are equipped with one or the other of these two types of drive. In a small percentage of installations, special factors may dictate the choice of steam or electricity for power purposes.

Diesel Engines

The Diesel engine of today is a highly perfected unit, capable of producing power at very low cost for fuel and labor. For that reason, Diesels have become increasingly popular and a large portion of our machines are now so equipped.

Suitable fuel and lubricating oil are two factors having a very important bearing upon efficient Diesel operation. The question of a suitable fuel oil should be checked with both the engine manufacturer and the refiner to make certain the engine is not handicapped by use of an unsuitable grade.

To work successfully the lubricating oil should be especially refined for Diesel service. Inferior or incorrect products are frequently the source of trouble and expense, common among which are rapid piston and ring wear, stuck rings, excessive oil consumption, etc. The oil should be capable of withstanding high temperatures and contamination by fuel and refuse of combustion. It should not form sludge or oxidized deposits as a result of continuous circulation within the crankcase.

The lubrication system commonly employed on Diesel engines is of the pressure circulation type in which all main and connecting rod bearings receive oil under pressure supplied by a pump. Cylinder walls are lubricated by the spray generated through oil escaping from the bearing ends. The oil pressure gauge should be read hourly and if there is any continued interruption of the pressure, immediate shut-down is advisable.

The oil level in the engine crankcase should be checked once or twice each 8 hour shift and fresh oil added in sufficient quantity to maintain the level at the desired height. Never permit the level to fall below the danger point on the gauge. For average conditions of service the crankcase should be completely drained (with engine warm) after 250 hours of operation and a fresh charge installed.

When running in a new engine change after the first 50 hours and then adhere to the 250 hour interval. Operators are particularly cautioned to avoid allowing dirt to enter the system when adding fresh oil.

Gasoline Engines

Economy, power output and service life of gasoline engines are directly affected by the grade of oil in service. The use of high quality motor oil of the correct body contributes largely to the general satisfaction obtained. Constant circulation within the crankcase plus contamination with fuel and products of combustion soon cause inferior oils to deteriorate with consequent loss of lubricating value.

Details of the lubrication system are likely to vary somewhat between different engine makes, although the pressure circulation type similar to that employed on Diesels is almost universally employed. Instructions concerning oil pressure, oil level, draining, etc., as given under "Diesel Engines" apply equally well to gasoline engines.

Electric Motors

To operate at highest efficiency the electric motors on Orton equipment require good condition of the windings, proper clearance (airgap) between rotor and stator, clean commutator, slip rings, brushes and internal parts. All these can be affected by improper lubrication.

Ring Oiled Motors—The use of unsuitable oil or the lack of adequate oil in the reservoirs of ring-oiled bearings produces bearing wear and gradual dropping of the rotor. This will naturally disturb the magnetic balance and impair efficiency of the motor. For this reason the level of oil in the reservoir should be checked monthly and make-up added as required. At the same time note if rings are turning freely. Every six months the bearings should be drained, flushed and refilled. Bearing covers should always be kept tight to seal against entrance of grit. Over-lubrication causing excessive waste oil may prove detrimental to motor efficiency and should be avoided.

A pure mineral oil of medium body and good quality is recommended for electric motors. Con-

tinuous reuse plus the heat common to these bearings will soon cause inferior lubricants to deteriorate with early loss of lubricating properties. Engine oils are usually too heavy for motors and should not be used.

Ball Bearing Motors—Ball bearings are usually grease packed and require a carefully made product which will not separate, cake or harden. The grease should also be free from acids, chemicals or fillers which may impair the finish of the balls. This type of motor is very easy to keep lubricated providing a grease suitable for ball bearing duty is used. On the contrary, ordinary greases are likely to show early disintegration due to the high operating temperatures and the severe centrifugal effects set up by the rapidly revolving balls.

Sparing relubrication about every six months is all the attention that will be required. Never pack the bearings tightly or fill under high pressure as this practice may cause the bearings to run hot and induce premature failure. It is always desirable to leave room for the grease to expand in service.

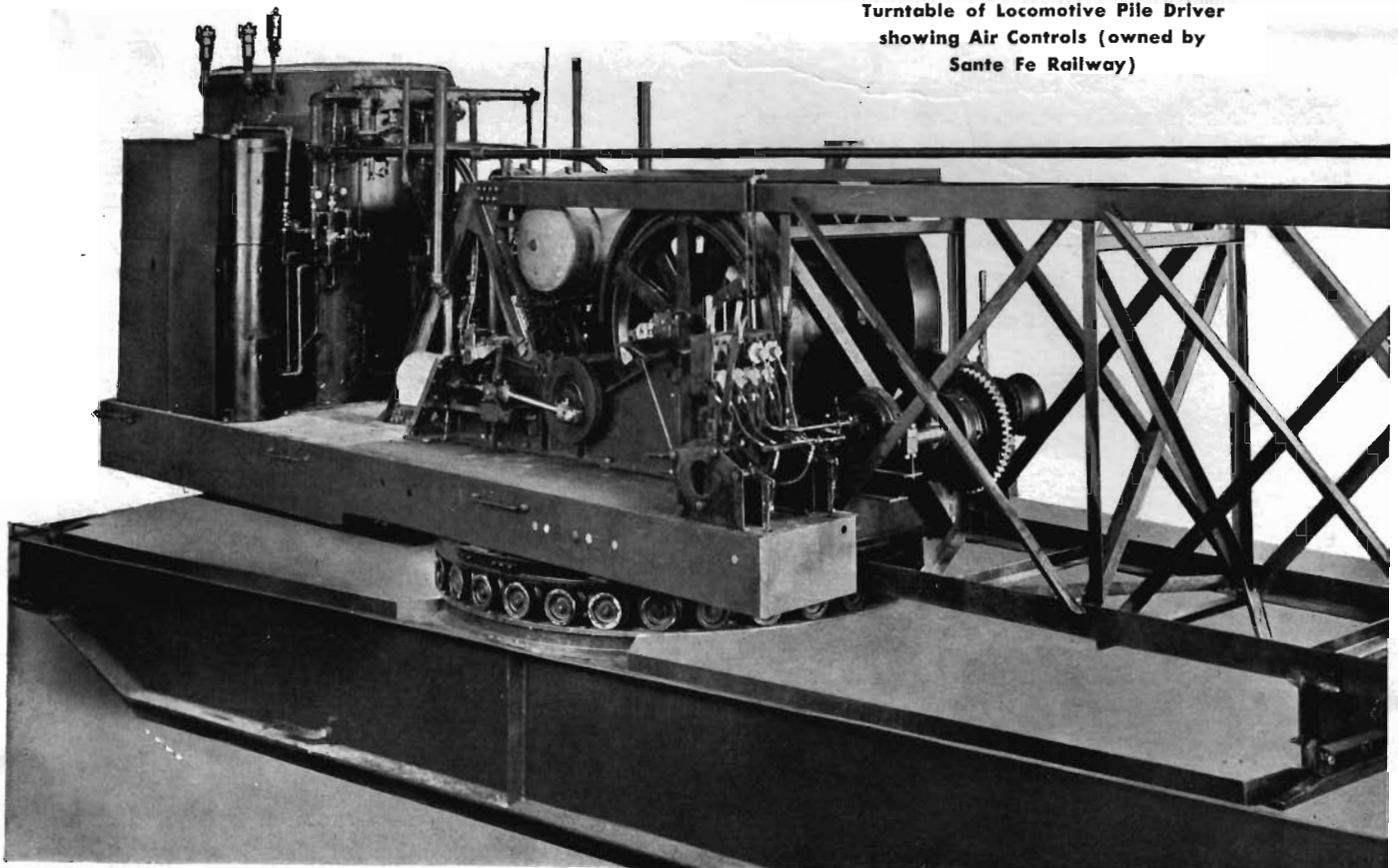
Steam Engine Drives

On cranes using steam for power purposes, the steam cylinders are usually lubricated by means of a mechanical force feed lubricator introducing oil into the steam line. The use of a high quality heavy bodied steam cylinder oil having adequate film strength at normal steam temperatures is desirable. The oil employed should provide effective piston seal and at the same time resist the washing effect of the steam which is always more or less wet in this class of service.

The proper rate of feed to each cylinder may vary considerably and is dependent upon loads, steam conditions, etc. The experienced operator can soon adjust this to furnish adequate lubrication without sacrificing economy of the lubricant.

NOTE: A liberal supply of cylinder oil should be fed into the engine just prior to shutting down. This will prevent rust from forming overnight on the bright metal parts and will greatly prolong the steam tight fit to which our cylinders and valves are built.

Turntable of Locomotive Pile Driver
showing Air Controls (owned by
Sante Fe Railway)



LUBRICATION CHART

Locomotive and Truck Cranes

Ball Bearings	Pressure Fittings	Once monthly	Gargoyle Grease Sovarex L-1
Bronze Bearings	Pressure Fittings Oil Holes	Every 8 hours Every 8 hours	Gargoyle Grease Sovarex L-1 Gargoyle Viscolite Oil Extra Heavy
Transmission Gears	Splash	Check level daily Do not overfill Change oil every six months or 1500 hrs. of operation	Gargoyle Compound No. 5
Boom Hoist Worm Gear	Splash	Check oil level weekly	Gargoyle Compound No. 5
Open Gears	Manual Application	Once weekly	Gargoyle Viscolite Lubricant No. 20 (apply hot) or Gargoyle Viscolite No. 20 Fluid
Wire Ropes and Cables	Manual Application	Once weekly	Gargoyle Viscolite Oil Extra Heavy
Friction Screw	Grease Packed	Refill once weekly	Gargoyle Grease Sovarex L-1
Air System Compressor	Splash	Check level weekly Change oil every six months	Gargoyle D.T.E. Oil Heavy Medium
Air Control Cylinders	Airline lubricator	Keep filled	Gargoyle D.T.E. Oil Heavy Medium
Electric Motors Plain Bearing	Ring Oiled	Check oil level once monthly	Gargoyle D.T.E. Oil Heavy Medium
Ball Bearing	Grease Packed	Relubricate once every six months	Gargoyle Grease Sovarex L-1
Steam Engines Cylinders	Mechanical Lubricator	Keep lubricator reservoir filled	Gargoyle Cylinder Oil 600 W
Bearings	Grease Cups	Turn down every 8 hours	Gargoyle Grease Sovarex L-1
	Oil Holes	Every 8 hours	Gargoyle Viscolite Oil Extra Heavy
Diesel Engines Gasoline Engines	} See instructions on page 9, also those issued by engine manufacturer.		

Note: (a) Where low temperature conditions prevail, lighter grades of the same lubricants may be used if needed for convenient application and adequate distribution.

(b) Clutches require no lubrication. Application of oil or grease may render them inoperative.



ORTON CRANE & SHOVEL CO.
General Offices: 608 S. Dearborn St., Chicago, Ill.
Works: Huntington, Indiana



ORTON CRANE & SHOVEL CO.
608 South Dearborn St.
Chicago 5, Illinois

MODEL: 75E-12DT CRANE NO. S-207

INDEX TO OPERATING INSTRUCTIONS

	<u>Page</u>
How To Use This Data	1
Power Plant	2
Radiator	2
Bevel Gear Case	2
Substructure	2
Superstructure	3
Pivot Post	3
Pivot Shaft	3
Propelling Clutch Mechanism	4
Hoist Drum Mechanism	5
Hoist Drum Brake	5
Boom Hoist Mechanism	6
Boom Hoist Brake	6
Sluing Mechanism	7

HOW TO USE THIS DATA

IMPORTANT: Read these instructions carefully and familiarize yourself with them. If carefully followed you will obtain the part or parts needed in the quickest possible time.

- 1st Always refer to your repair part drawing for the number and description of the part. For most parts these will be shown in assembly on drawing 224050 - however some other smaller drawings may be referred to also and if so this will be noted in the instructions covering that section of the machinery. DO NOT give us the number that appears on the piece itself. Find the illustration of the part corresponding to the one wanted and note its description and part number.

- 2nd Always give the shop number of the crane. This will be found on the rear vertical face of the left side frame or on the name plate mounted close to the operator's position. ~~This~~ number ~~always begins with the numeral "4" and has 5 digits.~~ ~~It~~ is also marked on the index page and at the top of these operating instructions.

- 3rd State quantity desired and how the material is to be shipped - whether by freight, express or parcel post, prepaid, etc.

- 4th Please be careful when using the word "set" as this is frequently ambiguous. For example, if a set of propelling friction blocks is desired note if you wish a set for one clutch or if you wish a complete set for the crane.

- 5th Send all orders to: ORTON CRANE & SHOVEL CO.
608 S. Dearborn St.
Chicago 5, Illinois

Please do not send orders to Huntington, Indiana

I N S T R U C T I O N S

POWER PLANT: Several items in the power plant are covered by separate instruction books included in this manual:

The engine on this crane is completely covered for instructions and the ordering of parts by the manual enclosed and issued by the "*Detroit Diesel Engine Division of General Motors Corp.*"

~~The engine clutch is covered by the Lima-Railway Corp.~~

* * * * *

RADIATOR: Use soft water in the radiator. Hard water results in lime deposits. This is a heat insulator and proper cooling will not be secured if deposits become excessive. If deposits become excessive - fill radiator with Sal-soda and water. Run engine for 5 or 10 minutes. Drain and flush thoroughly with several changes of clean water.

Observe care to drain the water in freezing weather or use suitable anti-freeze solution. The drain cocks will be found in the pipe below the water pump and at the bottom of the radiator.

Do not use any solid for anti-freeze. Use alcohol, glycerin, Prestone or other similar medium.

BEVEL GEAR CASE: The drive from the transmission into the main hoist side stand is covered by the repair-parts drawing #R147A. Parts should be ordered from this drawing.

For lubrication of the bevel gears - see the separate lubrication bulletin under the heading "Transmission."

211849

SUPERSTRUCTURE: The turntable is centered upon the car body of your crane by means of a heavy forged steel king pin or "Pivot Post." (Refer to drawing 224050 for full details and parts for the pivot post and shaft.)

The post is keyed in the car body, the turntable turning on it. Bronze bushings are mounted in the turntable. They are lubricated by means of copper tubing run out to pressure fitting located at convenient point.

The top of the post is flanged to receive any vertical uplift that may occur and is encircled with an oil reservoir with felt wick for lubricating the bearing surface between the top pivot hub flanged bronze bushing and pivot post collar. The lower end in the car body is threaded to receive a nut. This nut is made with 4 adjusting lugs for easy tapping around with hammer and screw driver.

The nut is tightened up until all vertical play is eliminated and the set screws are opposite the keyways of the post. The set screws are then turned down into the keyway and a piece of wire passed thru the drilled holes in the heads of the bolts to lock them. Care must be observed to maintain this nut tight.

PIVOT POST: The pivot post is hollow - it carries on its inside the pivot shaft for transmitting the power for traveling.

PIVOT SHAFT: The pivot shaft is carried by ball bearings, one set at each end of the post. The drive is thru bevel gear at each end of the shaft.

The bevel gear at the top is provided with a grease fitting for lubrication of the top pivot shaft ball bearing. The bottom ball bearing is lubricated thru the pivot post by means of copper tubing run out to pressure fitting located at convenient point. Proper supply of oil should be maintained.

PROPELLING CLUTCH MECHANISM: Refer to drawing 244529 for the general arrangement of the propelling clutch operating mechanism. Also to drawing 224050 for a complete listing of all parts.

Note that the gears each have 2 oil fittings and these should be lubricated at periods not oftener than 30 days and using a grease comparable to Stanolith #57.

To install new friction clutch shoes. In installing new shoes it is quite important that the shoes be attached to the pressure plate with the tap bolts no more than finger tight. The clutch should then be applied thru the use of the air valve following which the bolts may be tightened up. This is necessary to insure centering of the friction blocks.

Adjustment for wear of the friction blocks will be required only infrequently - however this may be accomplished by advancing lock nut ~~to~~ toward center of shaft.

A44296

Note that the friction blocks in this or any other set forming a single clutch should only be replaced in complete sets. Sets as received from the factory will be match-marked and should be installed in sets as marked.

Also note that the air valve actuating the propelling friction as well as other frictions on this crane (with the exception of the luffing friction) are graduated valves.

Air pressure applied to actuate the clutch is proportional to the travel of the hand lever on the valve. It is seldom necessary to use full travel on any of these clutches and you will avoid excessive wear and shock to the machinery if the lever is pushed rather gradually and no further than is necessary to secure the desired action.

The friction blocks should be maintained dry and completely clean. If the surfaces should become coated with oil then it is quite necessary that they be cleaned off with kerosene, fuel oil or some other solvent.

HOIST DRUM MECHANISM: Refer to drawing 224050 for the general arrangement of the hoist drum mechanism. Also to drawing 244154 for the thruster assembly which actuates these clutches.

Each of the 2 drums is mounted by means of 2 ball bearings on a sleeve and the ball bearings are held in position by adjustable locknuts and washers. These ball bearings should not require lubrication except at long extended intervals.

When the drum shaft is dis-assembled for any reason, these ball bearings should be thoroughly washed and re-lubricated using Stanolith #57 or comparable grease.

The sleeves which are mounted on the shaft and which carry the drums however will require lubrication at comparatively frequent intervals. There is a hole in the barrel of each of the 2 drums which allows access to a lubrication fitting and these should be given 1 or 2 shots of grease about once every 2 weeks.

Friction blocks, mark ③, can be replaced by removing the tap bolts and advancing the blocks in the groove to the relieved sections in the drum gear and pressure plate.

When installing new blocks follow the same procedure as described under the heading "Propelling Friction Clutch Mechanism" on page 4.

Application of the clutches is secured thru means of the thruster assemblies as diagramed on drawing 244154. Adjustment for wear may be secured by dis-engaging lever and by rotating adjusting screw counter-clockwise to secure desired amount of takeup.

The needle bearing part should be lubricated at intervals of 6 to 12 months by cleaning in mineral spirits or other solvent and repacking with Stanolith #57 or comparable grease.

The hoist frame ball bearing, part ⑫, and the thruster bearing, part ③, should similarly be repacked at intervals of approximately 1 year.

HOIST DRUM BRAKE: Examine the brake to ascertain that it does not touch the drum brake flange when released. The brake band can be adjusted by means of the bolts and springs provided - care being taken to see that the band bears evenly on the flange.

Oil should be removed from the brake band and prevented from reaching it so far as practicable. No rosin, chalk or gritty substances should be applied. Kerosene may be used to advantage to remove any accumulation of grease or oil.

The drum brake band is applied by means of a short cam lever. This cam arm should be about 11 ° forward of a right angle to the live end of the brake band when the brake band is applied.

BOOM HOIST MECHANISM: Refer to drawing 224050 for arrangement of the luffing (boom raising and lowering) mechanism. Refer also to drawing 244154 for the thruster assembly which is identical in arrangement altho not in dimension to that used on the hoist drum mechanism and also on the sluing mechanism.

Lubrication of the thruster mechanism should be as described for the hoist drum mechanism. The ball bearings carrying the bevel gears and friction cups will require lubrication only at infrequent intervals, such as when the shaft is dis-assembled for any reason.

At this time the ball bearings should be thoroughly cleaned and re-packed with Stanolith #57 or comparable grease.

To replace friction shoes on the luffing mechanism, remove the keys, (80) which will allow the pressure plate to be drawn back to allow ample room for replacement of the blocks. Follow the same procedure as described under heading "Propelling Clutch Mechanism", page 4, in installing the new blocks.

The worm shaft is carried upon 2 ball bearings, marks (154) and (155). These also will require lubrication only when it is necessary to dis-assemble this shaft.

Note however, that the boom raising drum is mounted on 2 bushings, (159) and it is necessary to lubricate these thru the lubrication fitting provided at intervals of not longer than 1 week.

BOOM HOIST BRAKE: Note that a safety brake is provided on the left hand friction cup, mark (75). This brake is applied thru a heavy spring which is always in action except when air is applied to use either the raising or lowering clutch.

Please note very carefully that while this brake is an automatic brake, it is quite important that it be given periodic inspection to determine when adjustment is required for normal wear of the lining.

This will be required only at rather infrequent intervals - however you must not allow this fact to cause you to neglect inspection of this mechanism. Failure of the brake thru neglect will cause serious and heavy damage to the crane boom and can easily cause serious injury or death to the ground crew.

SLUING MECHANISM: For the general arrangement of the sluing mechanism refer to drawing 224050. Note also that the general arrangement of the thruster assembly is as shown on drawing 244154 which is the same general arrangement as used for the hoist drums and the luffing mechanism.

All comments applying to the luffing mechanism will apply equally to the sluing mechanism. Note however that the brake for the sluing mechanism is operated by foot pedal. Adjustment of this brake is accomplished by advancing the bronze nut on the screw upon which it operates.

The vertical swinging shaft, (110) & (115), is mounted on ball bearings at top and bottom and these should be lubricated at intervals of 30 to 90 days by means of the lubrications fittings provided.

The fitting for the lower ball bearing has been piped up to above the turntable floor to make it easily accessible.

