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MORGAN ENGINEERING HAS BEEN A LEADING SUPPLIER OF MACHINING AND EQUIPMENT TO THE STEEL INDUSTRY FOR OVER 138 YEARS. OUR MACHINE SHOP IS EQUIPPED TO SERVE ALL OF OUR CUSTOMER NEEDS FOR BOTH MEDIUM AND HEAVY MACHINE WORK.

WE OFFER A VARIETY OF MACHINING EQUIPMENT INCLUDING ONE OF THE LARGEST PLANER MILLS IN THE WORLD, WHICH WILL ACCOMMODATE PARTS 20' WIDE X 105' LONG. OUR LARGEST LATHE CAN HANDLE 125" OVER THE CARRIAGE AND 343" BETWEEN CENTERS.

A COMPLETE RANGE OF TURNING, BORING AND MILLING EQUIPMENT IS AVAILABLE BOTH IN MANUAL AND CNC APPLICATIONS TO SATISFY CUSTOMER REQUIREMENTS. ATTACHED IS A DETAILED LISTING OF OUR EQUIPMENT. THANK YOU FOR TAKING THE TIME TO REVIEW THIS INFORMATION AND WE LOOK FORWARD TO WORKING WITH YOU.

SHOP FACILITIES LISTING

AREA UNDER ROOF

STRUCTURAL DEPARTMENT 2900	120,000 sq. ft.
MACHINE DEPARTMENT 3100	150,000 sq. ft.
ERECTION DEPARTMENT 3300	150,000 sq. ft.
WAREHOUSE DEPARTMENT 1024	40,000 sq. ft.

MACHINE DEPARTMENT

QUALITY CONTROL AND INSPECTION

All necessary inspection and checks for Quality Control are made between each step of the machining operations and before being processed to the next operation.

The following list is typical equipment used for performing these operations:

1. Layout Tables
2. Brinell Hardness
3. Ultrasonic and Dye Penetrant, etc.
4. Micrometers, Dial Indicators, Scales, Verniers and various other necessary Measuring Equipment
5. Profilometer (for surface quality of finish)

6 - E.O.T. CRANES MAXIMUM
LIFT CAPACITY 75 TON MAXIMUM
RUNWAY HEIGHT 30'0"

NUMERICAL CONTROL MILL

C.N.C. LATHE

<u>MACHINE NO.</u>	<u>MAKE</u>	<u>TYPE</u>	<u>SIZE</u>	<u>DESCRIPTION</u>
X-3276	WARNER-SWASEY	CHUCKER	25" DIAMETER	MODEL 3SC-M5240 CNC LATHE, 25" DIA. TURN, 30" DIA. SWING, 24" DIA. CHUCK, 12 STATION TURRET, 60 H.P. DRIVE.

HORIZONTAL BORING MILLS

<u>MACHINE NO.</u>	<u>MAKE</u>	<u>TYPE</u>	<u>SIZE</u>	<u>DESCRIPTION</u>
X-7026	GIDDINGS & LEWIS	FLOOR	50	7" DIA. SPINDLE, 19'4" COLUMN TRAVEL, 148" VERTICAL TRAVEL, 60" SPINDLE TRAVEL, 24'0" X 24'0" TABLE.
X-7028	GIDDINGS & LEWIS	FLOOR	50	7" DIA. SPINDLE, 24'0" COLUMN TRAVEL, 148" VERTICAL TRAVEL, 87½" RAM TRAVEL, 60" SPINDLE TRAVEL, 20'0" X 20'0" TABLE

HORIZONTAL BORING MILL (7" SPINDLE TABLE TYPE)

<u>MACHINE NO.</u>	<u>MAKE</u>	<u>TYPE</u>	<u>SIZE</u>	<u>DESCRIPTION</u>
X-6010	GIDDINGS & LEWIS	TABLE	570T	7" DIA. SPINDLE, 60" SPINDLE TRAVEL, 120" VERTICAL TRAVEL, 168" SADDLE TRAVEL, 168" TABLE CROSS TRAVEL, NUMERICAL READOUT SWITCHABLE

CNC HORIZONTAL BORING MILL (7" SPINDLE TABLE TYPE) (continued)

<u>MACHINE NO.</u>	<u>MAKE</u>	<u>TYPE</u>	<u>SIZE</u>	<u>DESCRIPTION</u>
1977	G & L	TABLE		<p>6" MODEL 70-H6-T HORIZONTAL TABLE TYPE BORING MILL, S/N 420- 147-67.</p> <p>EQUIPPED WITH THE FOLLOWING:</p> <ul style="list-style-type: none"> - ALLEN BRADLEY 8400 CNC CONTROL / 5 AXIS - 5 SERVO DRIVES - X,Y,Z, W ROTARY - 84" X 84" G & L CNC ROTARY TABLE, POSITIONING & CONTOURING. FULLY PROGRAMMABLE, 0- .5 REV PER MIN FEED RANGE - 13 DEGREE WEDGE ASSEMBLY FOR TABLE POSITIONING - G & L RIGHT ANGLE MILLING HEAD TO FIT THIS MACHINE - COOLANT SYSTEM - 10 TOOL HOLDERS FOR THE SPINDLE - PENDANT CONTROL
TABLE				

CNC HORIZONTAL BORING MILL (7" SPINDLE TABLE TYPE) (continued)

<u>MACHINE NO.</u>	<u>MAKE</u>	<u>TYPE</u>	<u>SIZE</u>	<u>DESCRIPTION</u>
X-9800	LUCAS	TABLE MILL	7" SPINDLES	MODEL 7264 FULL CNC MILL WITH ALLEN BRADLEY 9/260 SERIES CONTROL WITH 4-AXIS MOTION: TABLE X = 156" TRAVEL HEAD X = 94" TRAVEL SPINDLE Z = 57" TRAVEL SADDLE W = 85" TRAVEL 30 HP VARIABLE SPEED MOTOR ON SPINDLE. 0-850 RPM

PLANER MILLS

<u>MACHINE NO.</u>	<u>MAKE</u>	<u>TYPE</u>	<u>SIZE</u>	<u>DESCRIPTION</u>
X-8580	INGERSOLL	TRAVELING TABLE	10'8" X 8'0" UNDER RAIL	12" DIA. SPINDLE, TABLE 30'0" LONG. 2 VERTICAL HEADS, 12" DIA. SPINDLE, 100 H.P. EACH, 1 HORIZONTAL HEAD, 10" DIA. SPINDLE, 75 H.P., NUMERICAL READOUT, METRIC SWITCHABLE
X-8569	INGERSOLL	GANTRY	20'8" WIDE 105'0" LONG 12'6" UNDER RAIL	125 H.P. VERTICAL HEAD AND 125 H.P. HORIZONTAL HEAD, DECIMAL READOUT ON ALL MOTIONS, FULL LENGTH OF BED. SINGLE STATION CONTROL. NUMERICAL READOUT, METRIC SWITCHABLE

SHAFT GRINDER

<u>MACHINE NO.</u>	<u>MAKE</u>	<u>TYPE</u>	<u>SIZE</u>	<u>DESCRIPTION</u>
X-3821	NORTON	LATHE TYPE SHAFT GRINDER	14" X 144"	30" DIA. GRINDING WHEEL, 14" DIA. MAXIMUM WORK PIECES 114" LONG

ENGINE LATHES

<u>MACHINE NO.</u>	<u>MAKE</u>	<u>TYPE</u>	<u>SIZE</u>	<u>DESCRIPTION</u>
X-3115	LEBLOND	ENGINE	25"	24" CHUCK, 28" MAXIMUM SWING, 20" MAXIMUM OVER COMPOUND, 72" BETWEEN CENTERS
X-3116	LEBLOND	ENGINE	25 H.D.	25" CHUCK, 31" MAXIMUM SWING, 20" OVER COMPOUND, 16'0" BETWEEN CENTERS

ENGINE LATHES (OVER 48")

<u>MACHINE NO.</u>	<u>MAKE</u>	<u>TYPE</u>	<u>SIZE</u>	<u>DESCRIPTION</u>
X-6104	BETTS	DRUM	125"	72" CHUCK, 342" BETWEEN CENTERS, 125" MAXIMUM OVER CARRIAGE, CUT ANY THREAD OR PITCH, TAPER ATTACHMENT, 5" T.P.F. WITH 72" CUTTING LENGTH, 100 H.P.
X-6105	BETTS	DRUM	60"	60" CHUCK, 372" BETWEEN CENTERS, 60" MAXIMUM OVER COMPOUND, CUT ANY THREAD OR PITCH, 50 H.P. 52" OVER THE CARRIAGE

TURRET LATHES

<u>MACHINE NO.</u>	<u>MAKE</u>	<u>TYPE</u>	<u>SIZE</u>	<u>DESCRIPTION</u>
X-3239	WARNER & SWASEY	TURRET	5	12" MAXIMUM SWING, 2-3/4" BAR CAPACITY, 3/8" - 2-3/4" COLLETS
X-3247	WARNER & SWASEY	TURRET	4A	28 1/4" MAXIMUM SWING, 22-7/16" OVER COMPOUND, 9" BAR CAPACITY, 26" CHUCK, LEAD SCREW AND TAPER ATTACHMENTS, 1 TO 36 THREADS, 16" TRAVEL WITH TAPER ATTACHMENT

VERTICAL BORING MILLS

<u>MACHINE NO.</u>	<u>MAKE</u>	<u>TYPE</u>	<u>SIZE</u>	<u>DESCRIPTION</u>
1978	G & L	VERTICAL BORING MILL	127½"	SPECIFICATIONS: 120" DIA. TABLE - 4 JAW 127½" MAXIMUM SWING 90" MAXIMUM UNDER CROSS RAIL 40 TON MAX. LOAD ON TABLE 0-50 RPM ON TABLE 2 HEADS ON RAIL 64" STROKE ON RAMS 55 DEGREE SWIVEL ON RAMS .004 - .750 IPR FEED RATE ON HEADS/RAM 75 HP MAIN MOTOR - VARIABLE SPEED 650 - 2000 RPM 4 AXIS ACCURITE D.R.O. - 2 AXIS PER MIMIK TRACING SYSTEM ON RIGHT HAND HEAD

SEMI-AUTOMATIC VERTICAL MILLS

<u>MACHINE NO.</u>	<u>MAKE</u>	<u>TYPE</u>	<u>SIZE</u>	<u>DESCRIPTION</u>
X-3318	BULLARD	VERTICAL LATHE	46"	MAN-AU-TROL, 75 H.P.

PLANERS

<u>MACHINE NO.</u>	<u>MAKE</u>	<u>TYPE</u>	<u>SIZE</u>	<u>DESCRIPTION</u>
X-6479	GRAY	PLANER AND FUTURE MILL	7'0"	87" WIDE BETWEEN HOUSINGS X 276" LONG X 84" UNDER RAIL, TABLE 80" X 276" 1 RAIL HEAD FOR PLANING, 1 - 50 H.P. FUTURE MILL HEAD, 2 SIDE HEADS FOR PLANING

SLOTTERS

<u>MACHINE NO.</u>	<u>MAKE</u>	<u>TYPE</u>	<u>SIZE</u>	<u>DESCRIPTION</u>
X-1436	NEW ROCKFORD		25" STROKE	HYDRAULIC SLOTTER WITH ROTARY TABLE 42" DIA., TABLE TRAVEL 26" X 60"

DRILL PRESSES

<u>MACHINE NO.</u>	<u>MAKE</u>	<u>TYPE</u>	<u>SIZE</u>	<u>DESCRIPTION</u>
X-1682	WARD RIDDLE		A-500	GUN DRILL (DEEP HOLE DRILLING) SIZE UP TO 2" DIA., MAXIMUM DEPTH 64"
X-1687	CARLTON	RADIAL	6'0"	15" COLUMN, 72" ARM
X-1688	CARLTON	RADIAL	6'0"	15" COLUMN, 72" ARM, CLEAR 144" OVER PIT NO. 5 TAPER, 16" SPINDLE TRAVEL
X-1689	CARLTON	RADIAL	8'0"	19" COLUMN, 96" ARM, CLEAR 120" NO. 6 TAPER, 18" SPINDLE TRAVEL
X-1691	KAUKAUNA	RADIAL PORTABLE	9'0" HEIGHT 6'0" HORI- ZONTAL	PORTABLE UNIVERSAL DRILLING MACHINE HEAD FULLY UNIVERSAL 360°

MISCELLANEOUS SMALL MACHINES

<u>MACHINE NO.</u>	<u>MAKE</u>	<u>TYPE</u>	<u>SIZE</u>	<u>DESCRIPTION</u>
X-266	GOULD & EBERHART		28"	SHAPER
X-1700	PORTAGE	LAYOUT MACHINE	MODEL 48A	WITH ENGLISH AND METRIC 3A DIGITAL READOUT
X-1807	MITTS & MERRILL			#2 KEYSEATER
X-1821	LANDIS	2½ L 331		SCREW MACHINE
X-1827	MITTS & MERRILL	17232649		#5 KEYSEATER
X-1887	MARVEL	86313		NO. 8 SERIES BAND SAW

LAYOUT TABLES

<u>MACHINE NO.</u>	<u>MAKE</u>	<u>TYPE</u>	<u>SIZE</u>	<u>DESCRIPTION</u>
1		C1	18'0" X 40'0"	FLOOR TYPE LAYOUT TABLE
2		C1	65" X 12'0" 48" X 8'0" (L-SHAPED)	LAYOUT TABLE WITH PORTAGE LAYOUT MACHINE WITH NUMERICAL READOUT METRIC SWITCHABLE

ERECTION DEPARTMENT

QUALITY CONTROL AND INSPECTION

Assembled equipment is checked for proper alignment, squareness, span, height, etc., to comply with the specifications and Morgan Engineering Quality requirements.

The following is a list of typical equipment used for performing these operations:

1. Necessary Measuring Equipment
2. Optical Level
3. Transit
4. Tachometer
5. Ammeters, etc.

MORGAN ENGINEERING SHOP TESTING

The cranes are assembled as completely as possible. All motions are operated without load. Purchasers are invited sufficiently in advance when cranes are to be ready for Shop Test and Inspection.

ERECTION DEPARTMENT

PUNCH PRESS	1
BENDING MACHINE	1
THREADING MACHINES	7
SAWS	10
GRINDERS	5
DRILL PRESS	10
TAPPING MACHINES	1
WELDERS	19
PRESS	3
SHAPERS	2
DRILL SHARPENER	1
RADIUS MACHINE	1
BORING MACHINE	1
JOINTER	1
DRILL	1
SANDER	1
PLANER (WOOD)	1

11 - E.O.T. CRANES

MAXIMUM LIFT CAPACITY 140 TONS

MAXIMUM RUNWAY HEIGHT 60'0"

STRUCTURAL DEPARTMENT

QUALITY CONTROL AND INSPECTION

All necessary inspection and checks for quality are made between each step of the manufacturing process. Fitting and welding are inspected in accordance to the drawing specifications, applicable AWS requirements and in accordance with the Morgan Engineering Shop Procedure.

The following list is typical equipment used for performing these operations:

1. Magnaflux
2. Magnaglow
3. Ultra-sonic Test
4. Dye Penetrant
5. Normal Necessary Measuring Equipment
6. Temperature Gauges
7. Optical Level
8. Brinell Hardness

STRUCTURAL DEPARTMENT

PM BURNING MACHINE CNC BARNY 3 CONTROL 4 TORCHES	1	
PM BURNING MACHINES ELECTRONIC EYE, 5-TORCH EACH	2	WELDING UNITS:
BURNING TABLE 14'0" X 138'0"	1 5	CO ² SEMI-AUTOMATIC
RADIAL DRILL PRESSES	2 1	CO ² SPOT WELDER
STRAIGHTENERS	1 3	CO ² SHORT ARC SEMI-AUTOMATIC
SHEARS	2	ODGEN DART WELDER TWIN HEADS SUBMERGED ARC 1
GRINDERS	6	SEMI-AUTOMATIC SUBMERGED ARC 11
DRUM HEAT TREATING MACHINE	1	LEWIS BEAM 360 ^O ROTATE AUTOMATIC SUBMERGED ARC
500 TON PRESS BRAKE	1 1	
SAWS	5	REED BEAM MACHINE AUTOMATIC SUBMERGED ARC 1
PUNCHES	5	
PLATE ROLLS	2	LINCOLN PORTABLE AUTOMATIC SUBMERGED ARC (GIRDER) WELDING MACHINES 2 500 TO 600 AMP. AC AND DC HAND WELDING UNITS
SHOT BLAST ROOM	1 70	
24'8" WIDE, 20'0" HIGH, 69'3" LG.		PLASMA ARC BURNING MACHINES 2
SAND BLASTING UNITS	1	CAPABLE OF CUTTING UP TO 3" THICK NON-FERROUS OR STAINLESS STEEL MATERIAL IN UP TO SPEEDS OF 250" PER MINUTE
JOINTER (WOOD)	1	
PLANER (WOOD)		
ANNEALING FURNACE 22'0" WIDE, 18'0" HIGH, 60'0" LG.	1	5 - EOT CRANES 12 - MONORAIL HOISTS
PAINT ROOM 19'9" HIGH, 18'8" WIDE, 160'0" LG.		MAXIMUM LIFT CAPACITY 30/15 TON MAXIMUM RUNWAY HEIGHT 30'-0"
INSPECTION BOOTH 49'10" LG., 15'0" WIDE, 16'9" HIGH	1	