

# Cost Saving Application Ideas For Cutting And Welding



## Bug-O Systems

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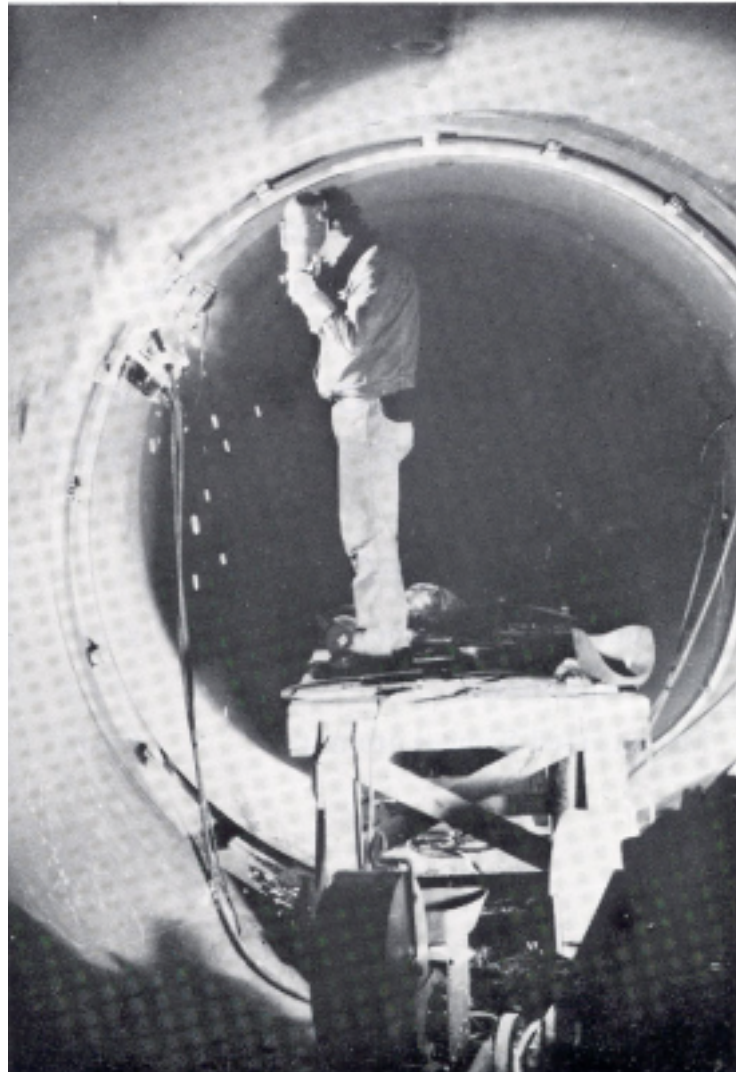
# Applications

## Economic Analysis of Mechanized Weiding with Flux Cored Wire.

(Manual Stick Electrode Welding Compared To Manual Semi-Automatic Welding And Mechanized Semi-Automatic Welding).

**IF YOU FABRICATE METAL, YOU KNOW THAT FABRICATION AND LABOR COSTS CONTINUE TO INCREASE.**

- Manufacturing companies must address the problem of increasing costs and the need to remain competitive in the world market.
- Fabrication costs can be reduced by using new technologies and new manufacturing processes.
- These new approaches are the key to remaining competitive in the world market.
- A large West German manufacturer of pressure vessels and large pipe systems has made an analysis of their welding costs which we are pleased to present herewith.
- This report uses the actual figures from the manufacturer. They show that the use of a semi-automatic welding process mechanized with Bug-O Systems equipment produces impressive cost reductions in fabrication. The analysis includes purchasing costs for the semi-automatic equipment and the Bug-O equipment.
- The comparison was made between the following processes:
  1. manual stick electrode welding
  2. manual semi-automatic welding with flux cored wire
  3. mechanized semi-automatic welding with flux cored wire





**THE PURCHASE COSTS OF THE EQUIPMENT WERE AS FOLLOWS:**

- 1. For Manual Stick Welding;**  
A power source, eletrode holder, ground clamp and the necessary cables Price; \$1,694.92
- 2. For Semi-Automatic Welding;**  
A power source, wire feeder and smoke exhaust system with the necessary cables to connect the equipment. Price; \$6,779.66
- 3. For Mechanized Semi-Automatic Welding;**  
Same equipment used in item 2 plus a ROL-O Weaving Kit. Price; \$11,864.40

**PURCHASE COSTS OF CONSUMABLES:**

Stick Electrode	\$1.00/pound
Flux Cored Wire	\$2.00/pound

**WELDING CAPACITY BASED ON THE OPERATING FACTORS SHOWN:**

Manual Stick Electrode	(25% Operating Factor)	.88 lbs./hr.
Manual Semi-Automatic Welding	(30% Operating Factor)	1.32 lbs./hr.
Mechanized Semi-Automatic Welding	(70% Operating Factor)	3.09 lbs./hr.

**ONE THOUSAND HOURS WAS USED AS THE OPERATING BASE PER YEAR FOR EACH OF THE THREE PROCESSES.**

**LIFE OF THE EQUIPMENT:**

Manual Stick Electrode	10 years
Semi-Automatic Welding	5 years
Mechanized Semi-Automatic	5 years



Automatic innershield welding with DCD ROL-O and Speed Weaver of a Penstock - 6 to 12 o'clock position, vertical up, overhead.

The following table shows that even with a cost factor of seven to one for the mechanized semi-automatic versus manual stick welding, and with a consumable costing twice as much, the pay back on the mechanized semi-automatic is less than six months.

This analysis points to the urgent need to change

from manual to fully mechanized processes. Mechanized welding should be a prime consideration in the design phase.

At first, it would appear that the initial investment is high but, in fact, it results in maximum efficiency and savings.

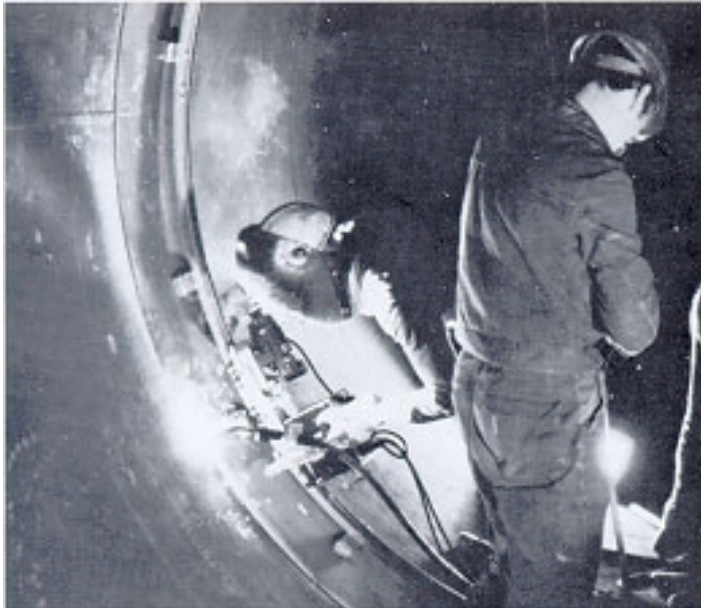
<b>COST ANALYSIS</b>			
<b>Operating Expenses</b>	<b>Manual Stick</b>	<b>Manual Semi-Automatic</b>	<b>Mechanized Semi-Automatic</b>
1. Purchase Price	\$1,694.92	\$6,779.676	\$11,864.41
2. Accessories	-----	1,016.95	1,355.93
3. Total Investment (1+2)	1,694.92	7,796.61	13,220.34
4. Working Life	10 years	5 years	5 years
5. Yearly Operating Hours	1000 hours	1000 hours	1000 hours
6. Labor & Overhead	20.40	20.40	20.40
7. Calculated Depreciation Per Year	169.49	1,559.32	2,644.07
8. Calculated Interest Rates Per Year (Based on 8% interest rate)	67.80/yr.	311.86/yr.	528.81/yr.
9. Yearly Investment Expenses (7+8)	237.29/yr.	1,871.19/yr.	3,172.88/yr.
10. Maintenance	67.80/yr.	423.73/yr.	423.73/yr.
11. Spare Parts	33.90/yr.	423.73/yr.	423.73/yr.
12. Machine Costs Per Hour (9+10+11): (5)	.34/hr.	2.72/hr.	4.02/hr.
13. Operating Time JFor 1433.25 lbs. (650 kg) Deposited Metal	1625 hours	1083 hours	464 hours
14. Manufacturing Costs (6 x 13) + 12 x 13)	33,601.70	24,971.53	11,302.71
15. Costs/Consumables For 1433.25 lbs. (650 kg) Deposited Metal	1,4323.20	2,864.41	2,864.41
16. Total Costs (14 + 15)	35,033.90	27,835.93	14,167.12
17. Total <b>SAVINGS</b> Compared To Manual Stick	-----	\$7,197.97	\$20,866.78
18. <b>SAVINGS</b> In Percent (%)	-----	20.5%	59.5%



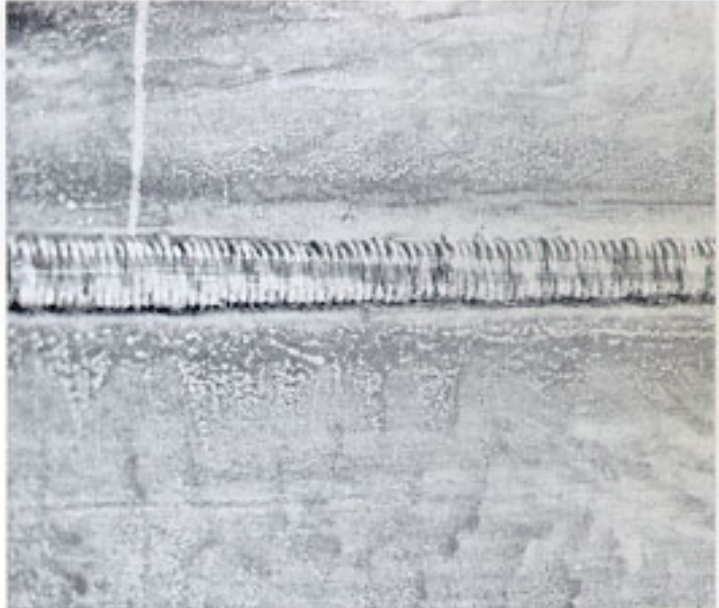
12 o'clock position, overhead.



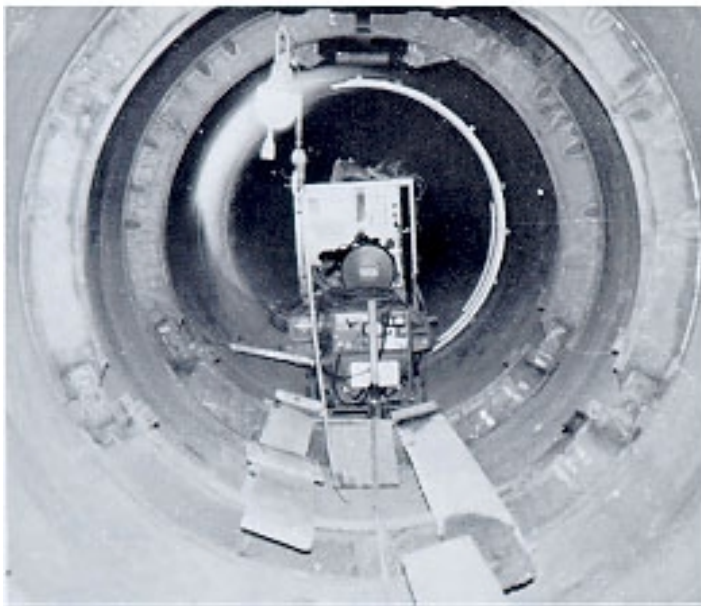
Weld position, vertical up.



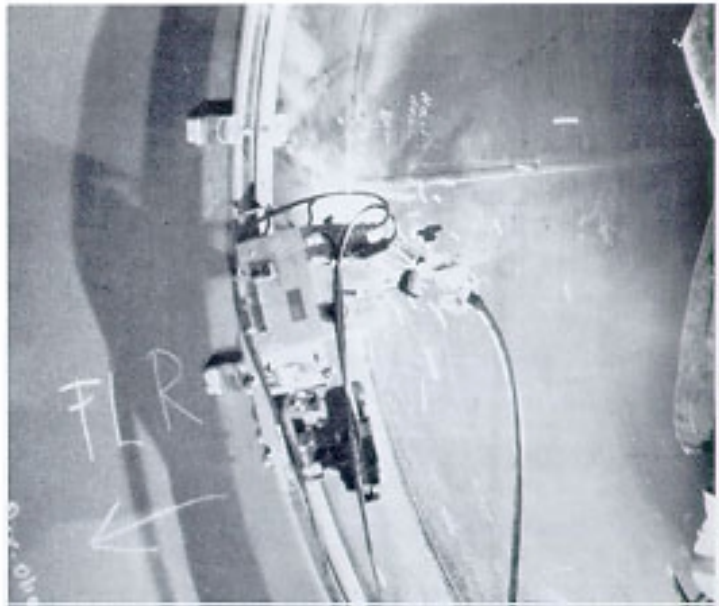
Weld position, vertical up.



Finished weld.



Equipment inside the Penstock.



9 o'clock position, vertical up.





# Applications

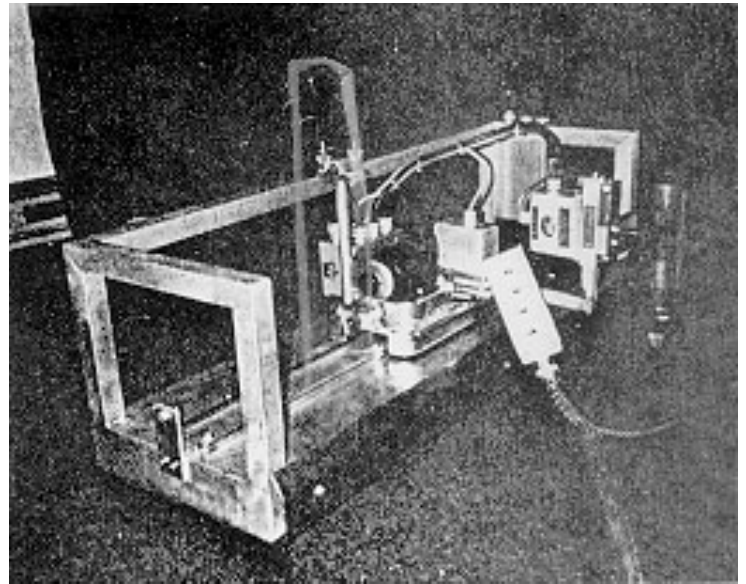
## Straightline Cutting

**Application:** Cutting residue in aluminum reduction pots

**Process:** Plasma cutting

**Equipment:** BUG-O Mark III (DC-III), ARR-Rail, (2) Power Rackers, Right Angle Rack, Cable Anchor Assembly and Limit Switch Kit.

**Savings:** Faster cutting, safer working conditions for the operator.

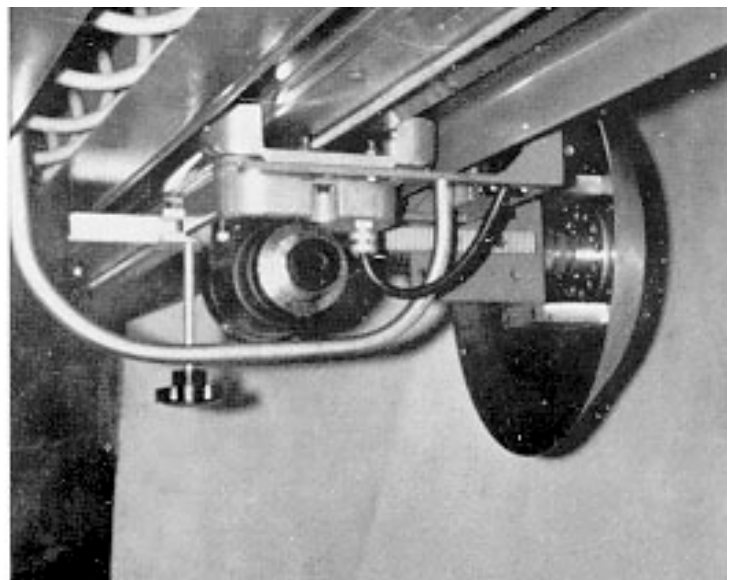
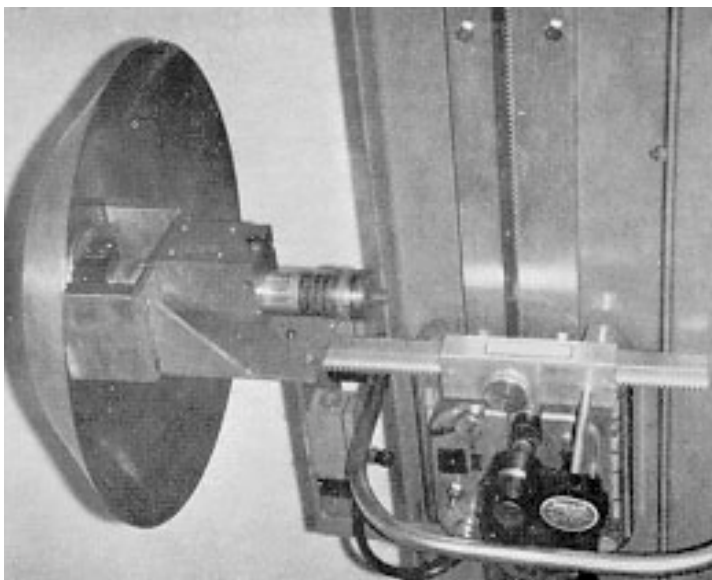


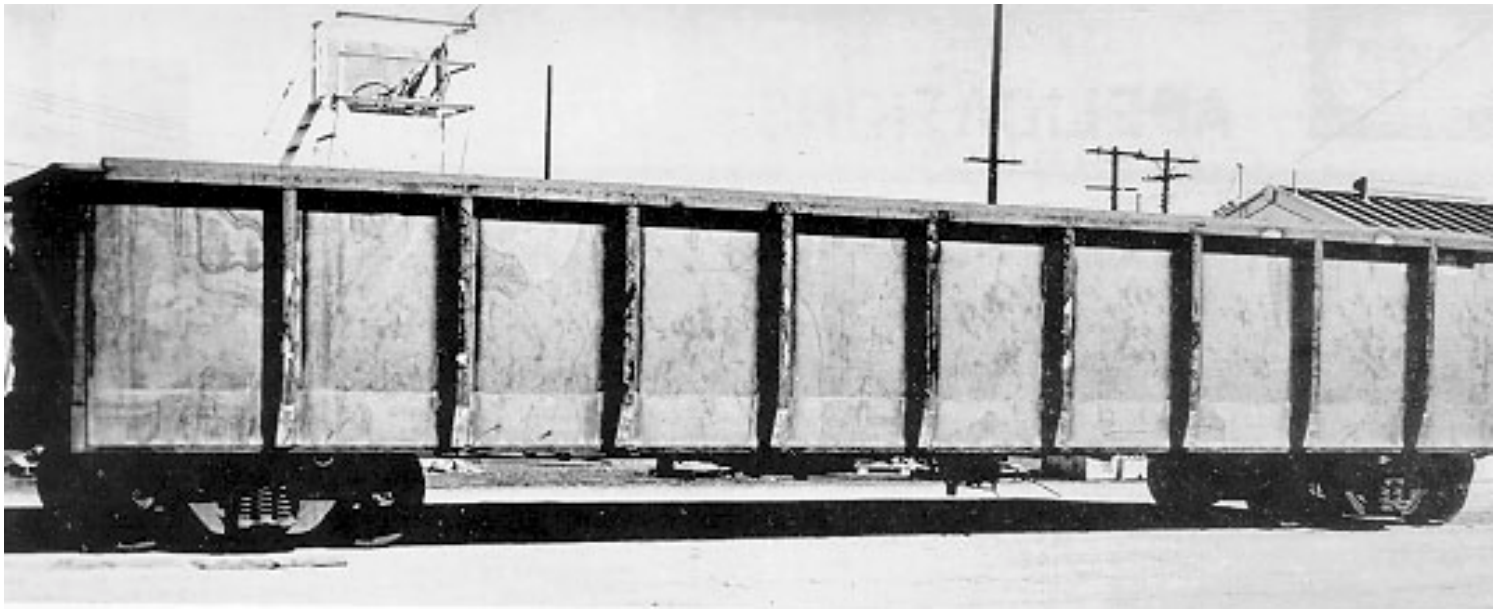
**Application:** Precision movement of nuclear mass gauge.

**Process:** Inspection

**Equipment:** BUG-O Heavy Duty Welding Kit and Limit Switches.

**Savings:** Low cost, easy to assemble system with minimum maintenance.



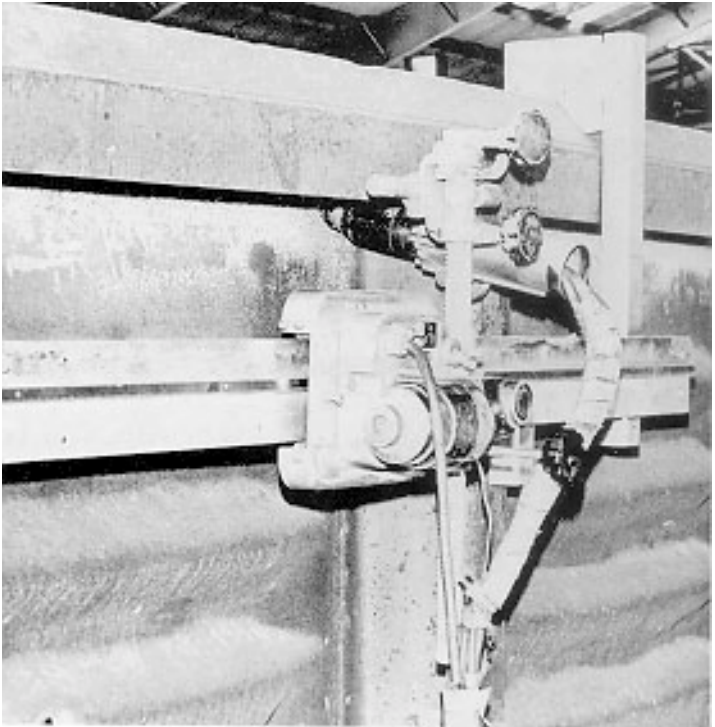


**Application:** Removing railway car sides and ends.

**Process:** Plasma cutting.

**Equipment:** BUG-O Straightline Kit.

**Savings:** \$1,000.00 per day.



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**Application:** Trimming edges of pressure vessels.

**Process:** Oxyfuel gas cutting.

**Equipment:** BUG-O Straightline Kit with Extra Rails and Fixture built by Customer.

**Savings:** Eliminated grinding, produced straight, accurate cuts.



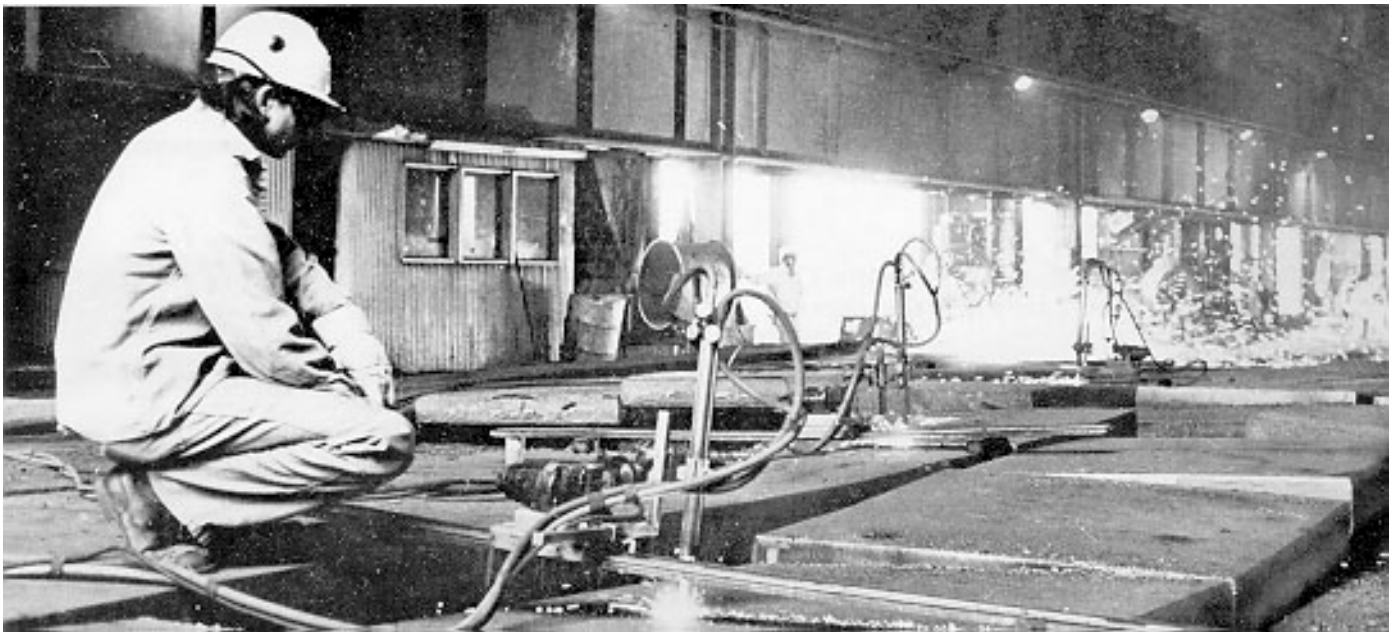
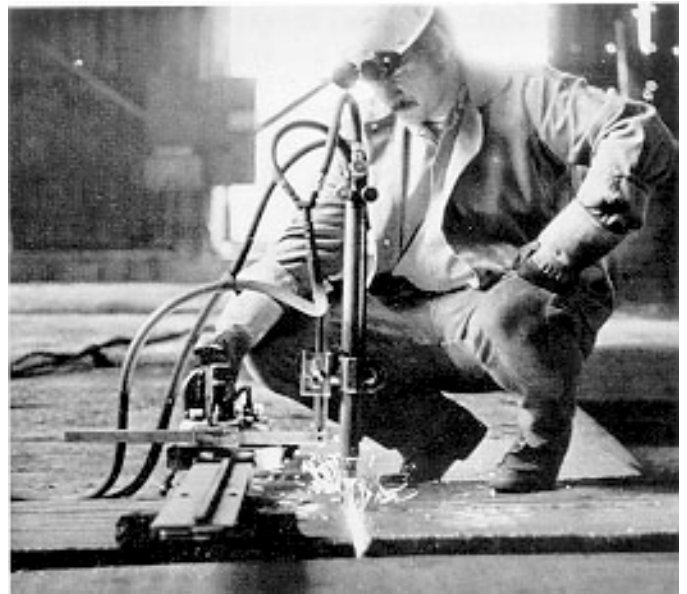


**Application:** A steel manufacturer's crop shear broke. While being repaired, it was necessary to crop 600 slabs per day to maintain production.

**Process:** Oxyfuel gas cutting.

**Equipment:** BUG-O Straightline Kits (38)

**Savings:** Operating 24 hours/day, 7 days/ week with inexperienced operators, the BUG-O equipment kept the mill working on a normal schedule.

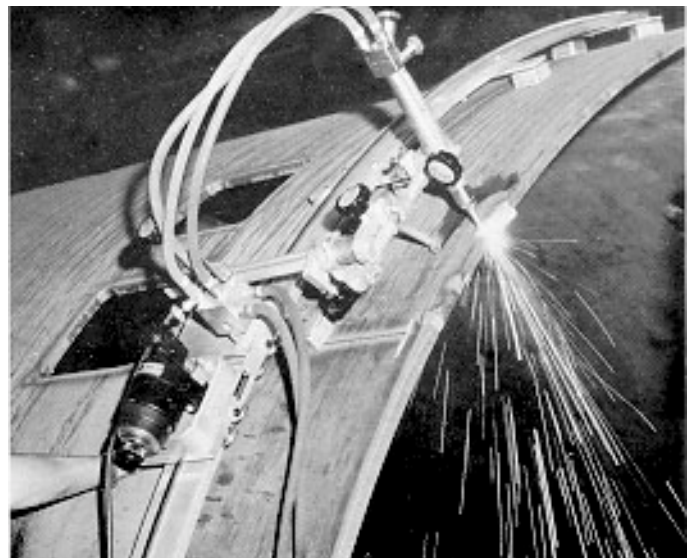


**Application:** Large turbine generator shells would not fit under conventional machine tools. Portable BUG-O equipment was transported and used.

**Process:** Oxyfuel gas cutting.

**Equipment:** ROL-O Carriage, Panograph, Bent Rails and Magnets.

**Savings:** Precision, portable equipment reduced material handling, repairs and grinding, which reduced welding costs and improved quality.



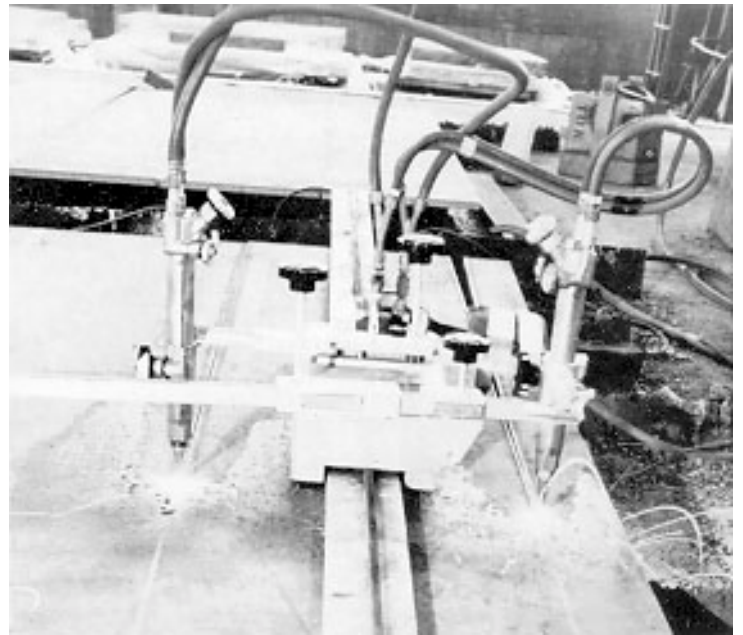


**Application:** Manufacturing parts for power boilers.

**Process:** Oxyfuel cutting.

**Equipment:** GO-FER II Kit

**Savings:** Burning time reduced 50%.

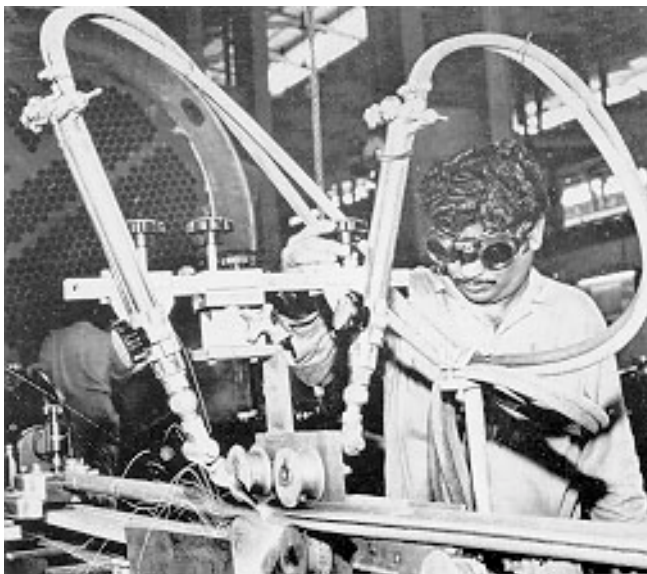
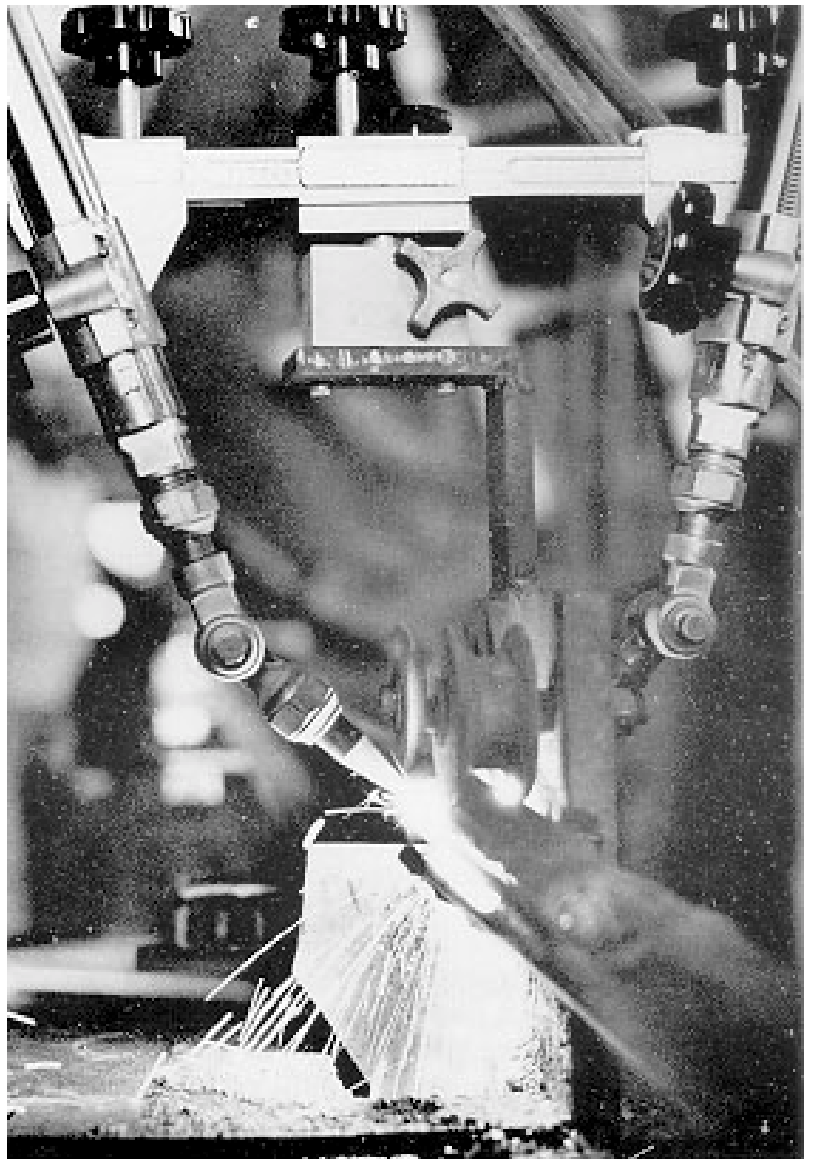


**Application:** Pipe cutting (moving the pipe past fixed torches).

**Process:** Oxyacetylene cutting

**Equipment:** BUG-O DC Straightline Kit, two machine torches with adjustable tip adapters and customer fixturing.

**Savings:** \$8,068.00 on the job.

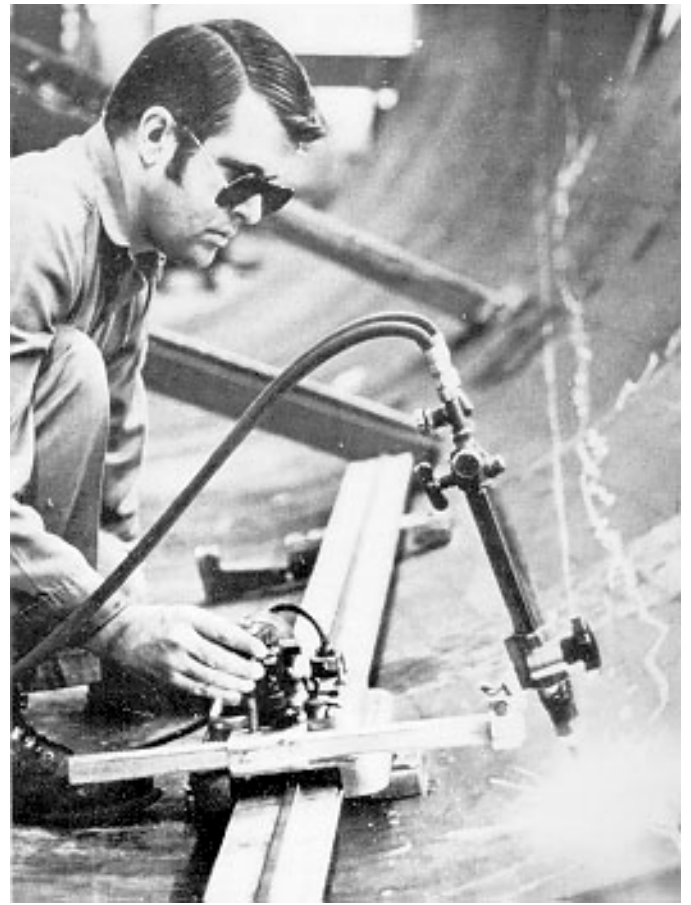


**Application:** Fabrication of scrap hoppers for steel mills.

**Process:** Oxyacetylene flame cutting.

**Equipment:** BUG-O DC Straightline Kit.

**Savings:** Portable equipment reduced material handling and improved productivity 3 times over hand cutting.



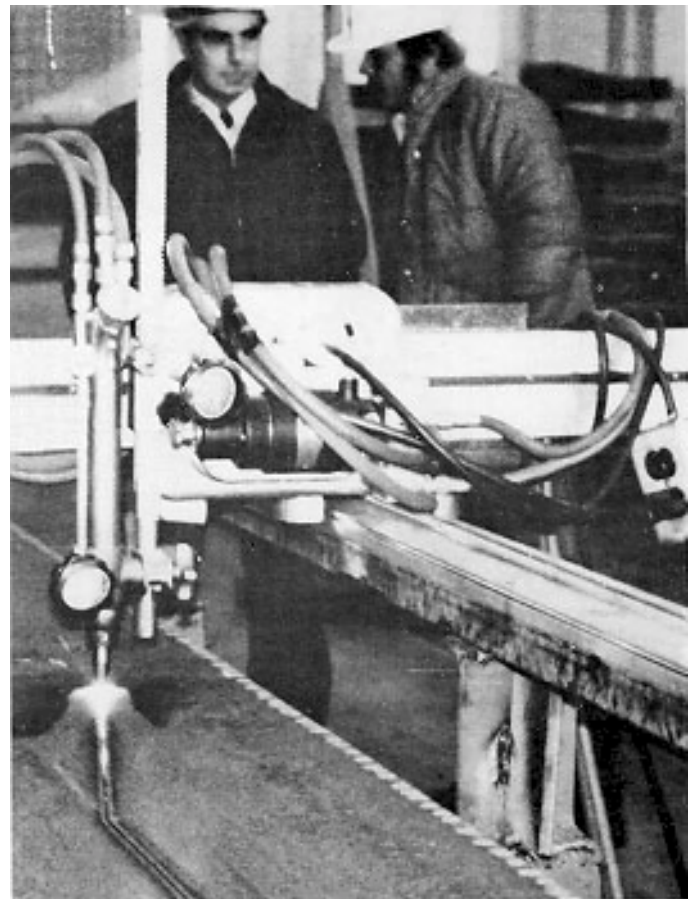
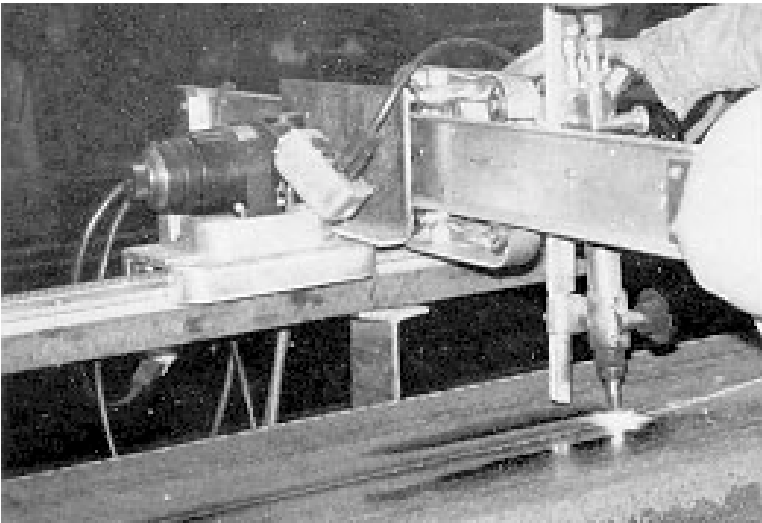
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**Application:** Fabrication of railway car sidesills.

**Process:** Oxyfuel cutting.

**Equipment:** BUG-O DC II and DC-III, rails and torch mountings.

**Savings:** Cutting time reduced 66%, improved quality eliminated grinding.



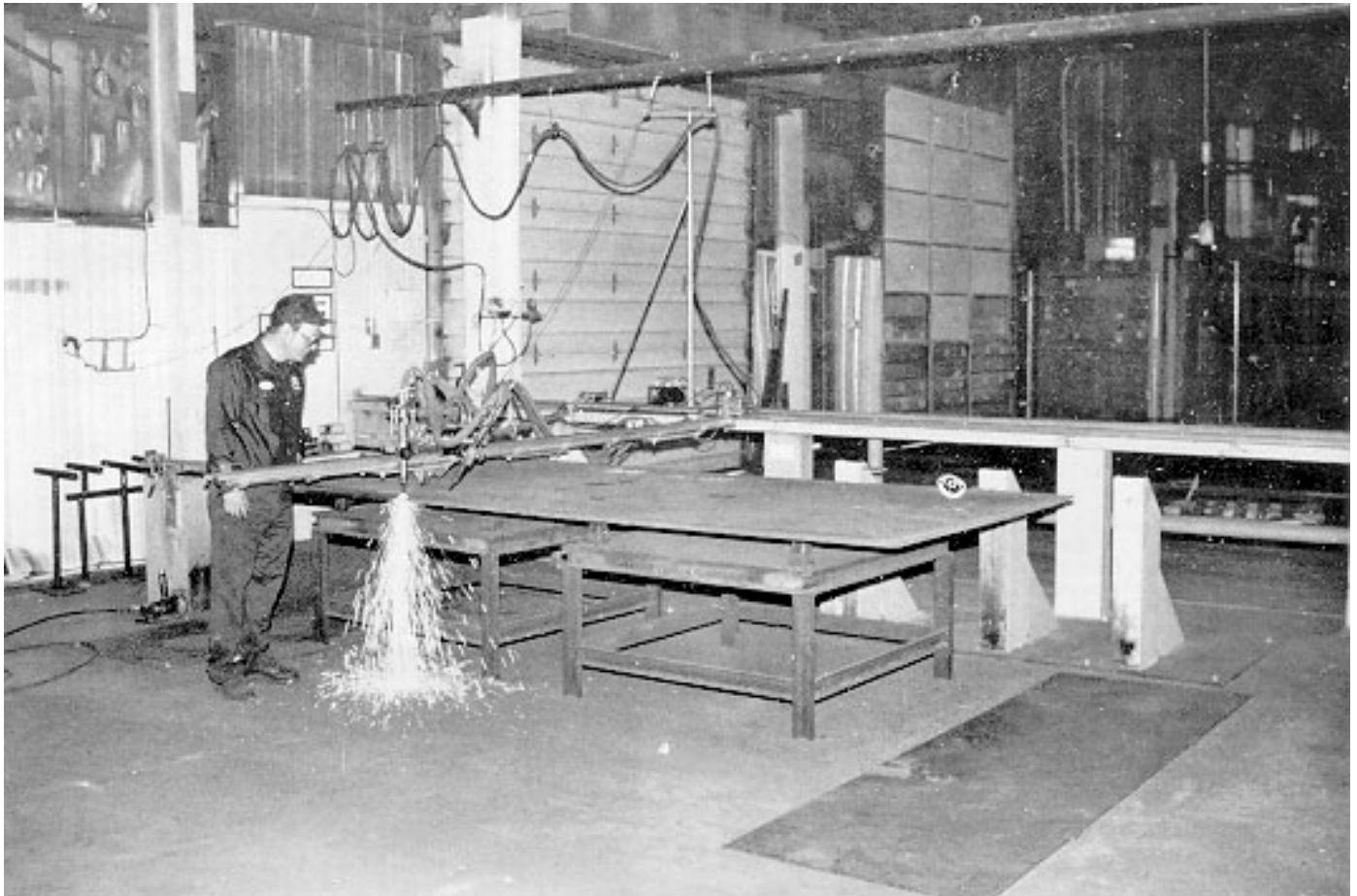
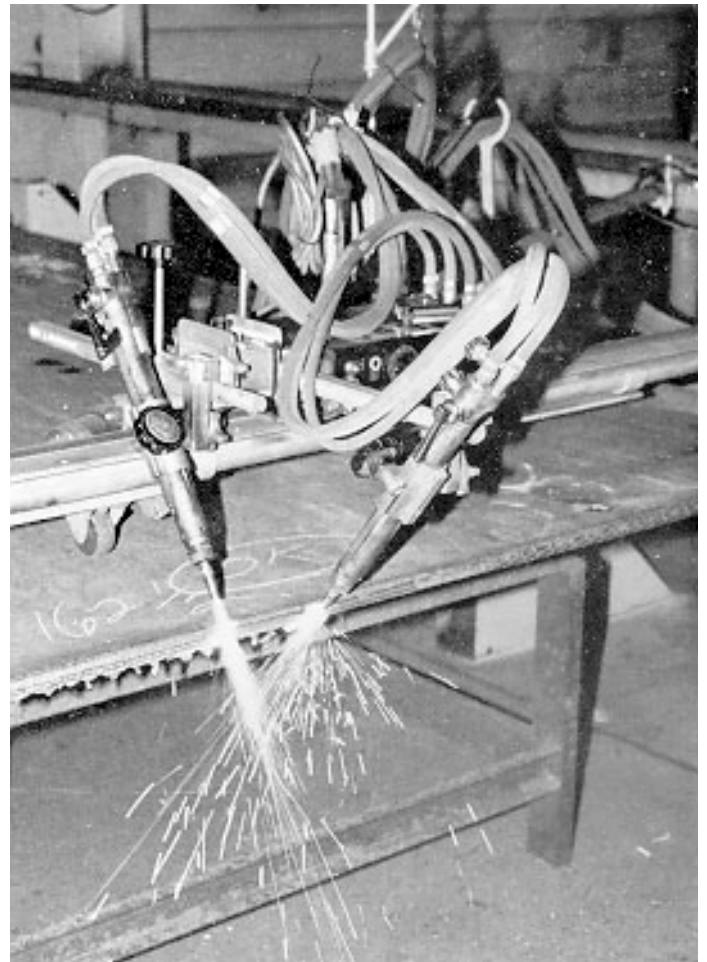


**Application:** Cutting and beveling large plates.

**Process:** Oxyfuel cutting.

**Equipment:** Folding MUG-O with cross drive (BUG-O DC II) and torch mounts.

**Savings:** \$7,342.00 per year.



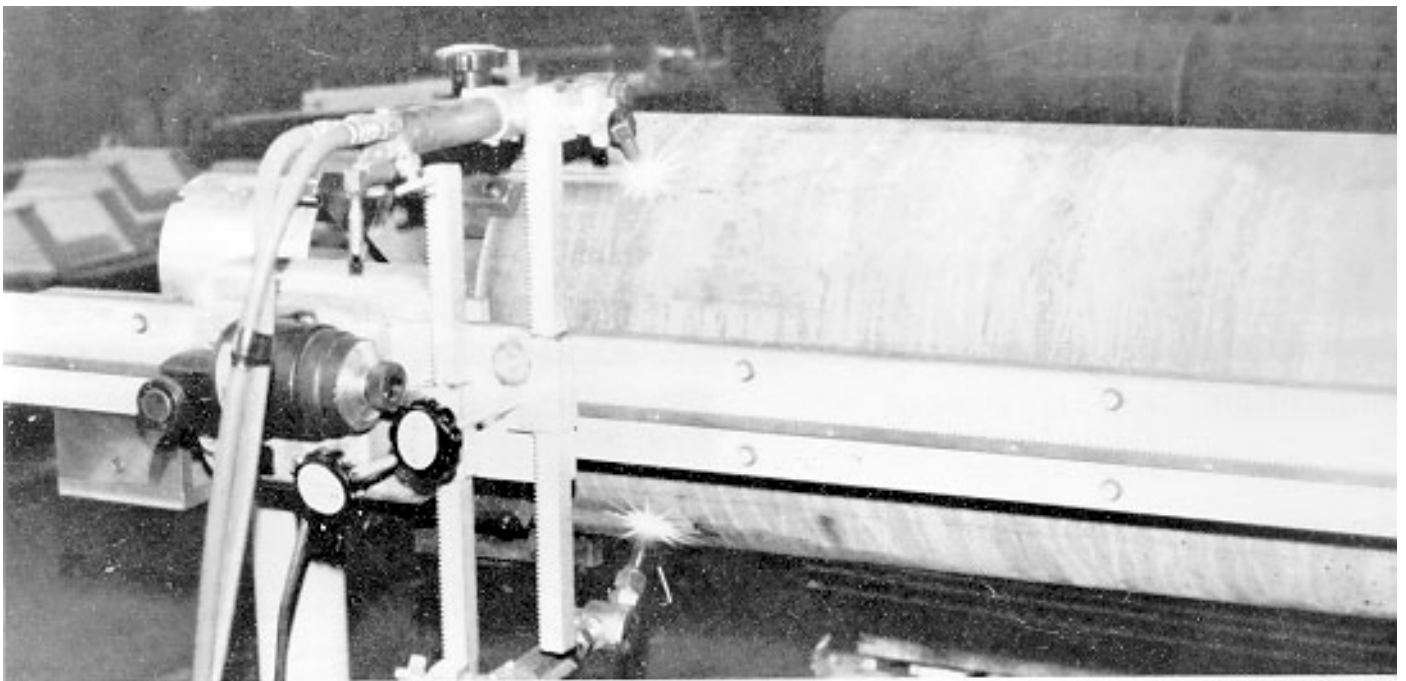
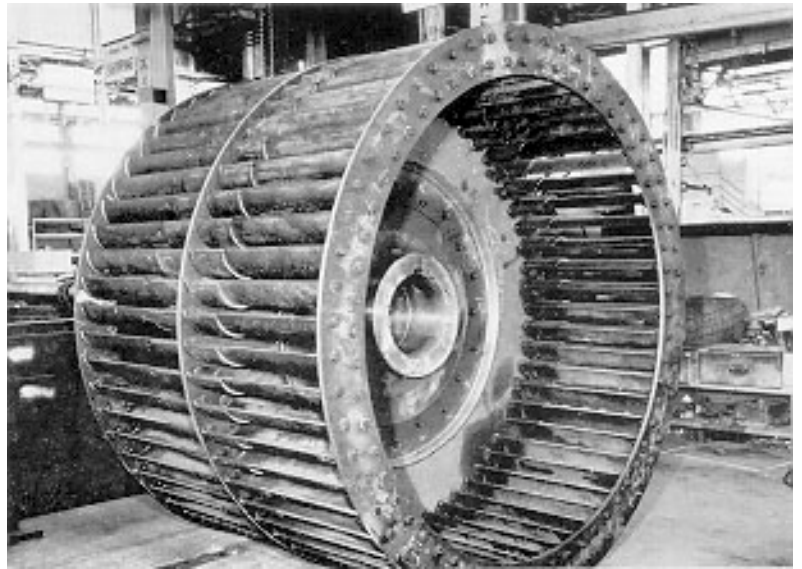


**Application:** Cutting parts for centrifugal fans.

**Process:** Oxyfuel cutting.

**Equipment:** BUG-O DC II with double torch cutting group and ARR-1080 rails, fixture supplied by customer.

**Savings:** \$12,000.00 per year.



**Application:** Trimming dam gates on river dams

**Process:** Oxyfuel cutting.

**Equipment:** BUG-O DC Straightline Kit

**Savings:** 6 times faster than manual operation.



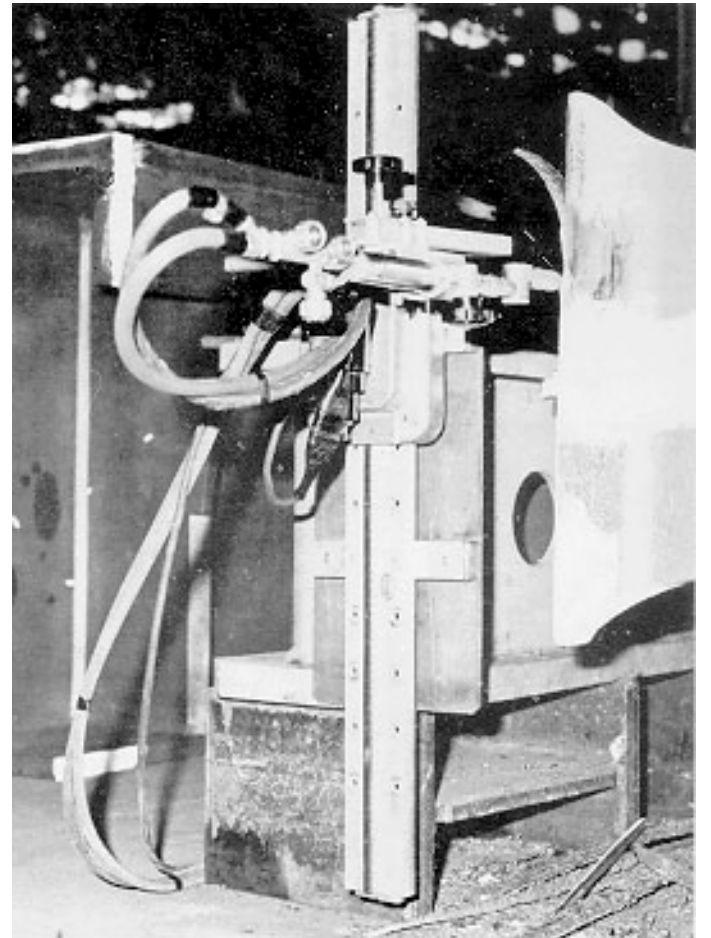
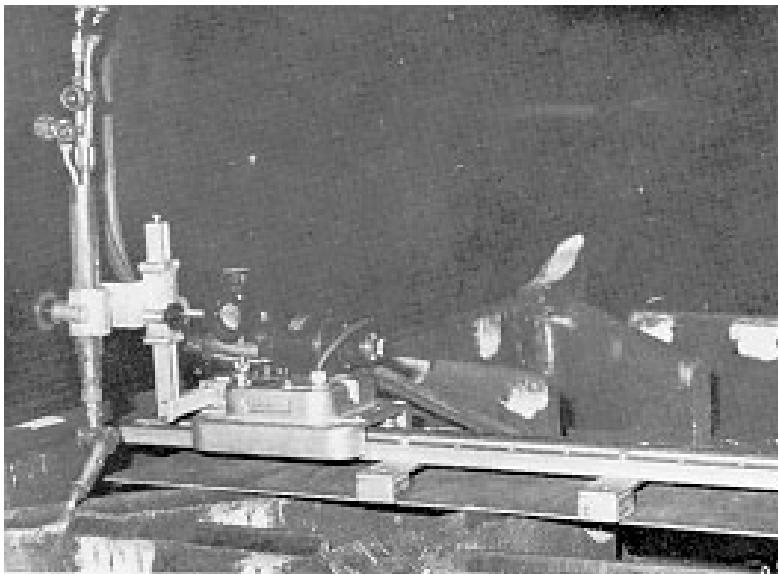
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**Application:** Beveling weld joints on marine diesel engines.

**Process:** Oxyfuel cutting.

**Equipment:** BUG-O DC Straightline Kit

**Savings:** Increased production and quality.







# Applications

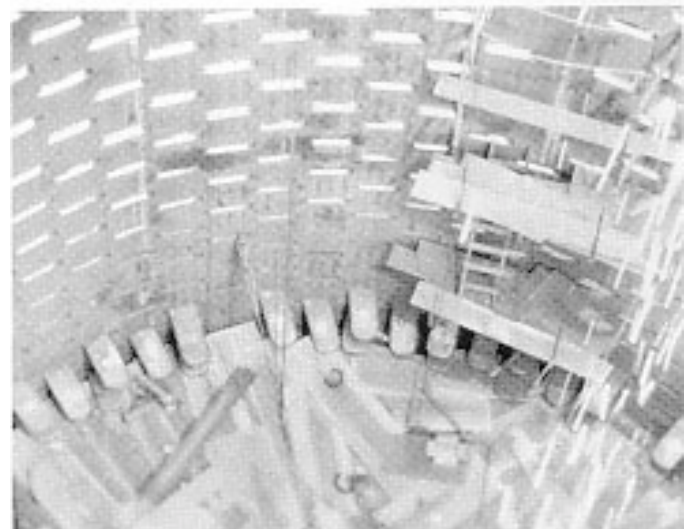
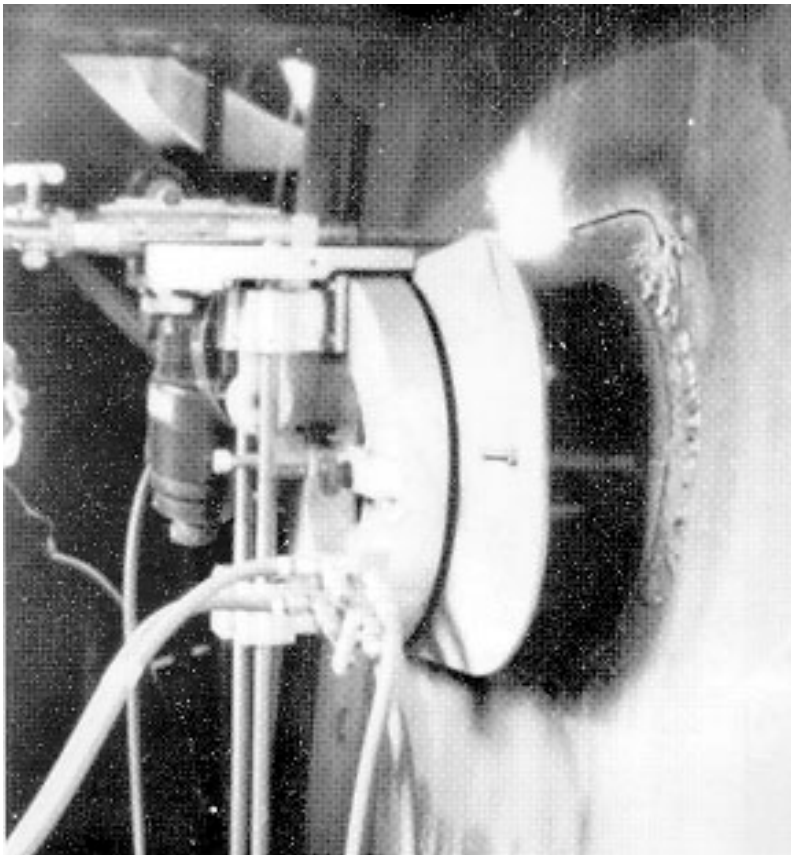
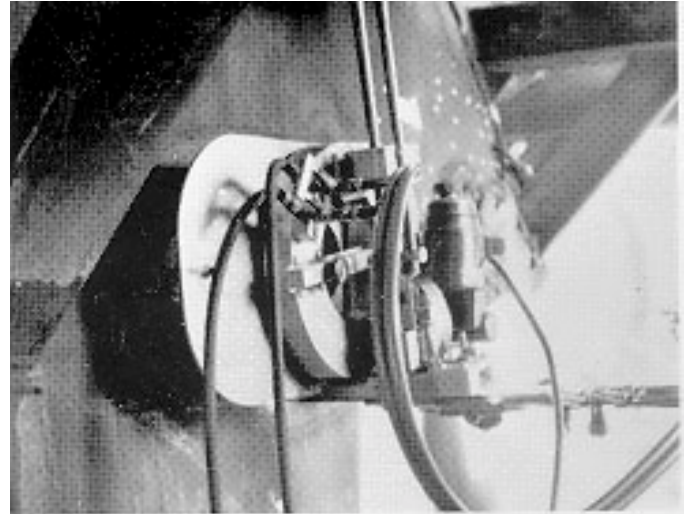
## Circular or Radial Cutting

**Application:** Rebuilding blast furnace required cutting elliptical openings 27" x 18" (686 mm x 457 mm) with a 6" (152 mm) radius.

**Process:** Oxypropane cutting.

**Equipment:** HOB-ROUND Machine.

**Savings:** 200% savings in flame cutting time and additional savings due to accurate, smooth cuts which eliminated grinding.



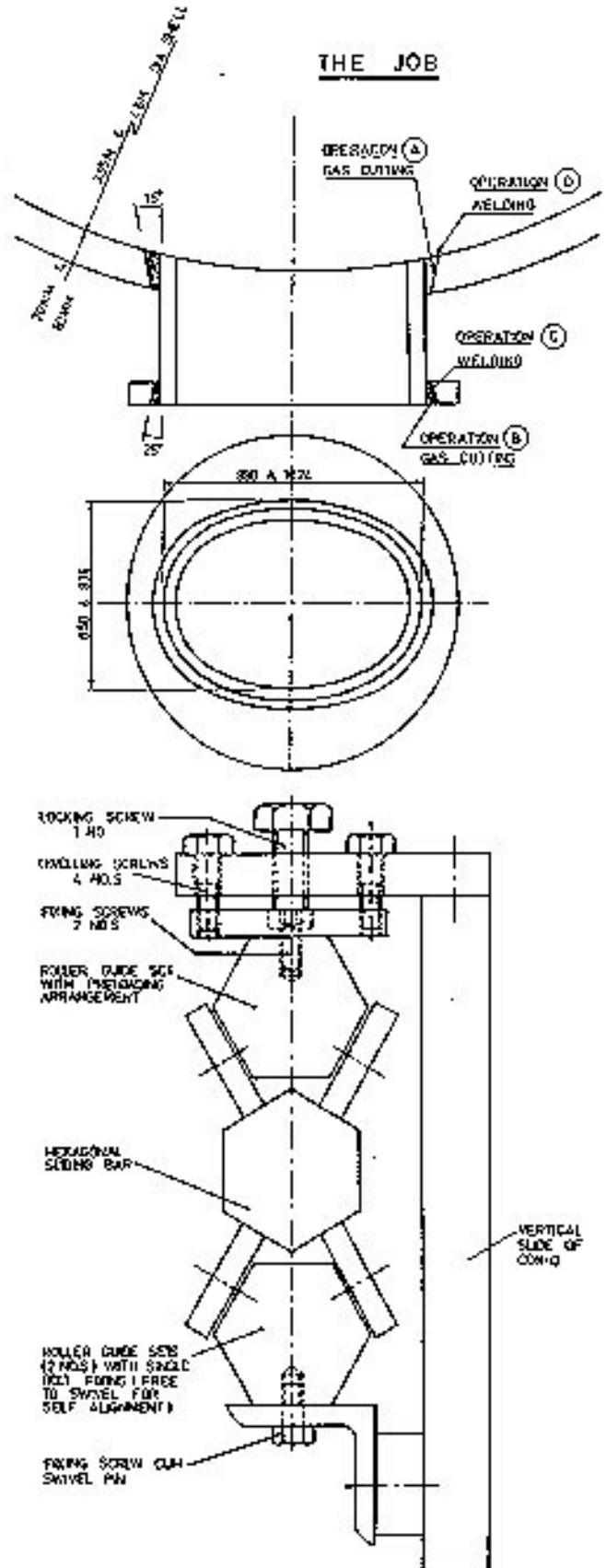
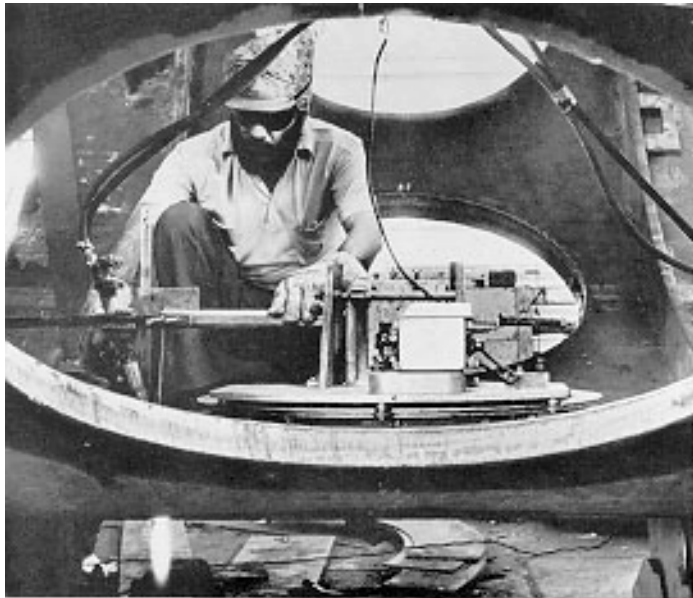


**Application:** Cutting and welding elliptical openings on rotating cement kilns to produce high quality product.

**Process:** Oxypropane cutting; thin wire sub arc welding.

**Equipment:** CON-4, modified by customer.

**Savings:** 80% over manual flame cutting and 40% over manual welding.



**Application:** Removal of heads used to pressure test (hydrostatically) heat recovery piping for the fertilizer industry and preparation of piping for field welding.

**Process:** Oxyfuel gas cutting.

**Equipment:** CIR-5 with carriage mounted to customer's fixture so that ring gear with torch rotates instead of the carriage.

**Savings:** Flame cutting and weld preparation time reduced 500% with semi-skilled operator.

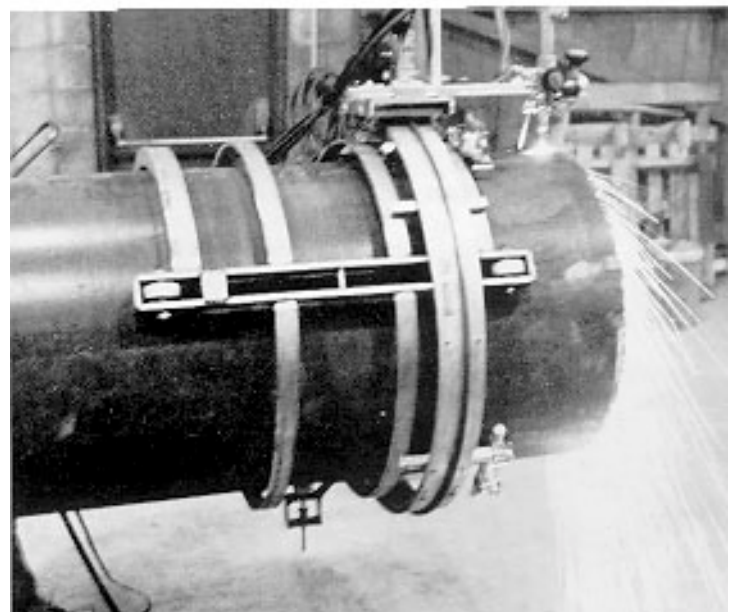
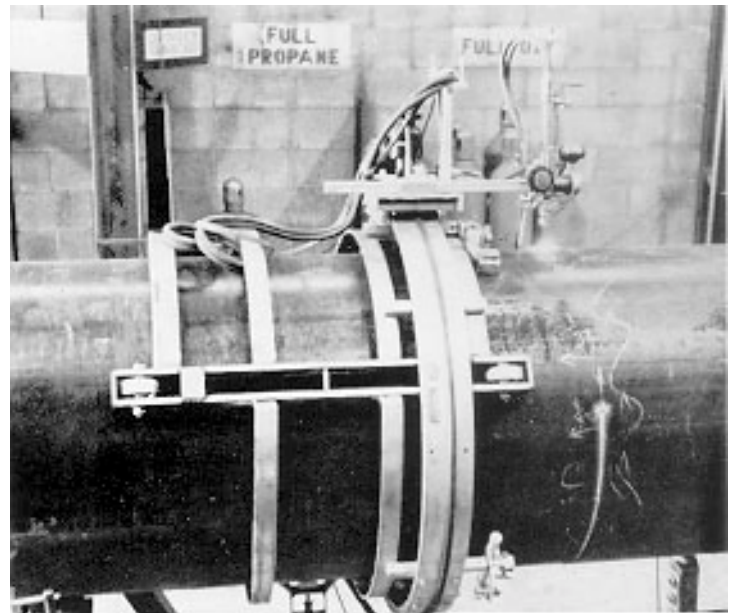


**Application:** Flame cutting pipe sections to length accurately; 30" (769 mm) O.D. pipe x 3/4" (19 mm) wall - the ends had to be perpendicular with 0.130" (3.3 mm)

**Process:** Oxyacetylene.

**Equipment:** Two BRR-Bent Rail mounted on customer's fixture; ROL-O Carriage, panograph, manifold and magnet assembly.

**Savings:** Burning time reduced 43%.



**Application:** Flame cutting helical flights on screw-shaft conveyor on a taper.

**Process:** Oxyfuel gas cutting.

**Equipment:** BUG-O Straightline Kit.

**Savings:** 64% direct labor savings, plus; reduction in cycle and handling time.



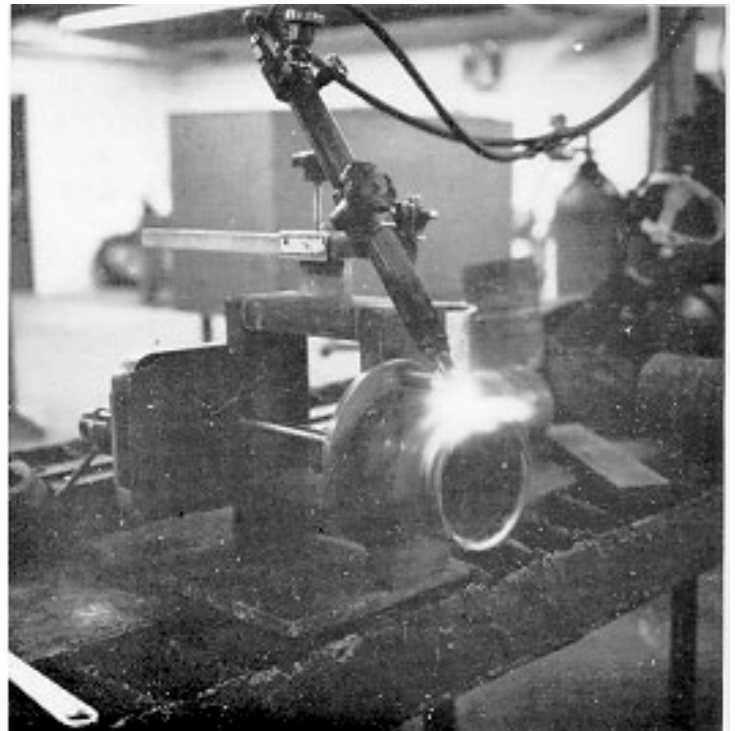
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**Application:** Prepare pipe ends for welding at vo-tech school.

**Process:** Oxyacetylene.

**Equipment:** BUG-O Drive Unit and lathe bed made by customer.

**Savings:** Flame cutting and weld preparation reduced to 2 minutes each.





**Application:** Flame cut and bevel large phosphate calcining kiln to facilitate rebuilding.

**Process:** Oxyacetylene.

**Equipment:** BRR-Bent Rail, panograph, manifold and magnets.

**Savings:** Labor cost reduced 50%.

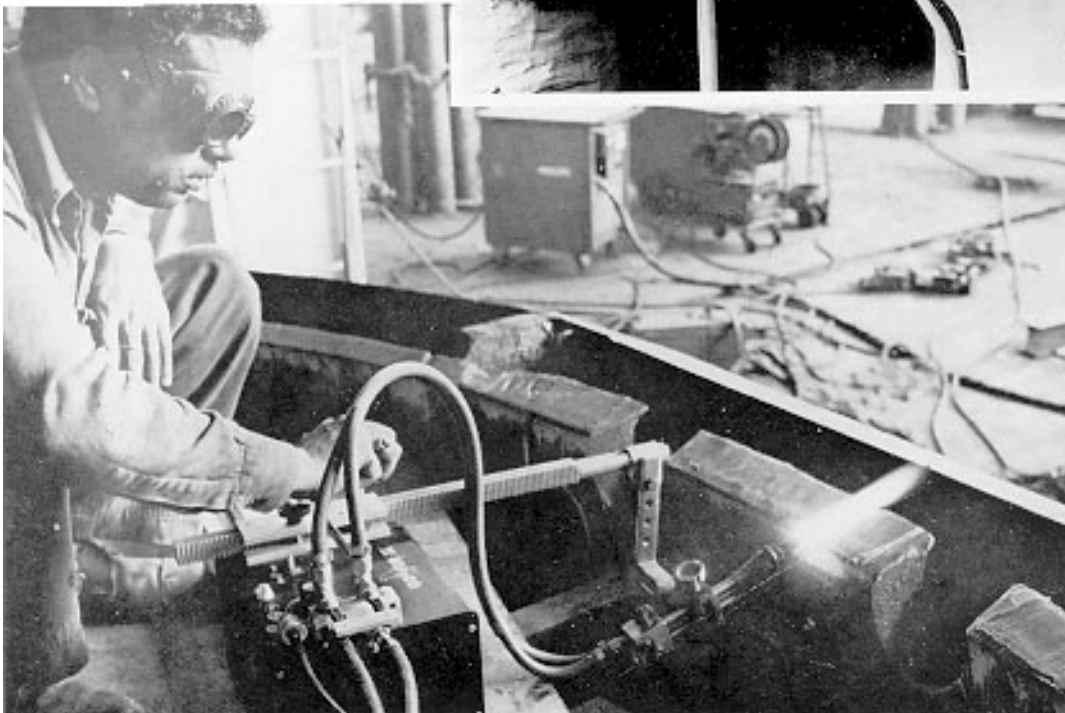
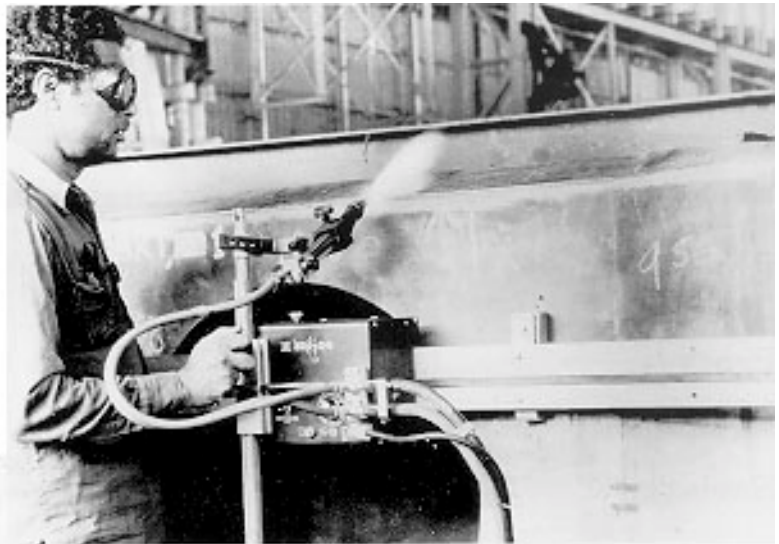


**Application:** Flame cutting on LD converter trunnion ring to replace top and bottom flanges.

**Process:** Oxyacetylene.

**Equipment:** GO-FER II, ARR-Rails and magnets.

**Savings:** 61% cost reduction.

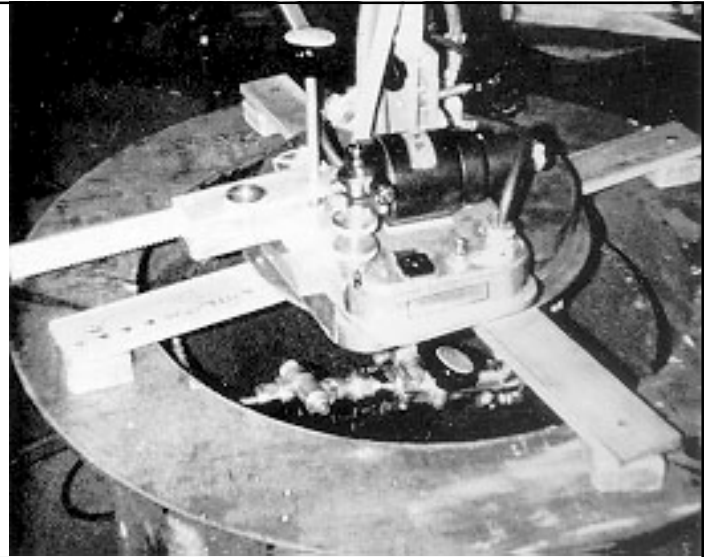
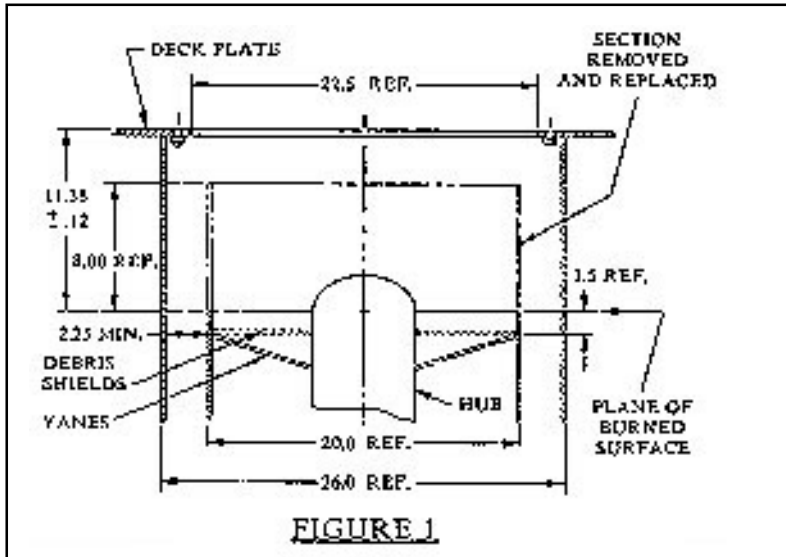


**Application:** Remove pipe section in remote, confined area of nuclear reactor.

**Process:** Oxyfuel gas cutting.

**Equipment:** HOB-O with fixture supplied by customer.

**Savings:** Cost of HOB-O was 10% of quote for mechanical cutting system; set up, cutting time and labor savings 50% lower than mechanical cutting.

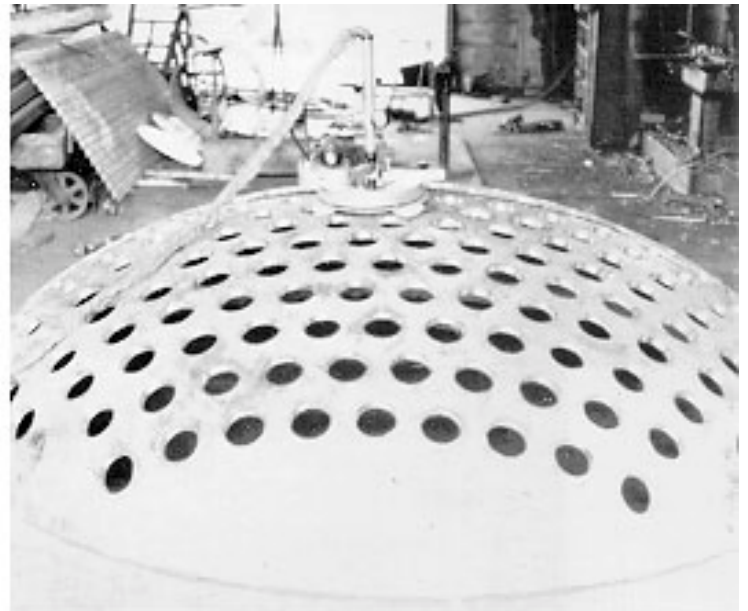
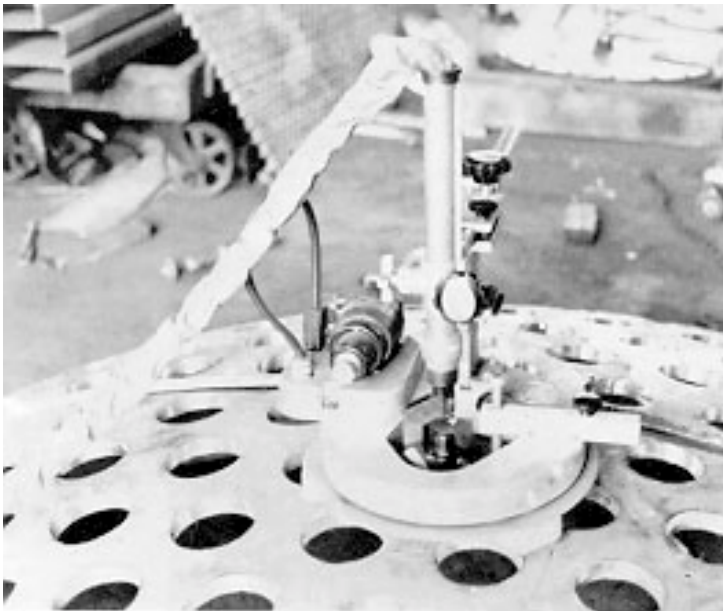


**Application:** Cutting 280, 4" (100 mm) diameter holes in 1" (25 mm), Type 304 Stainless Steel Elliptical Head.

**Process:** Plasma cutting.

**Equipment:** HOB-O

**Savings:** Accurate, uniform, quality holes at 1/10th the cost of machine boring.



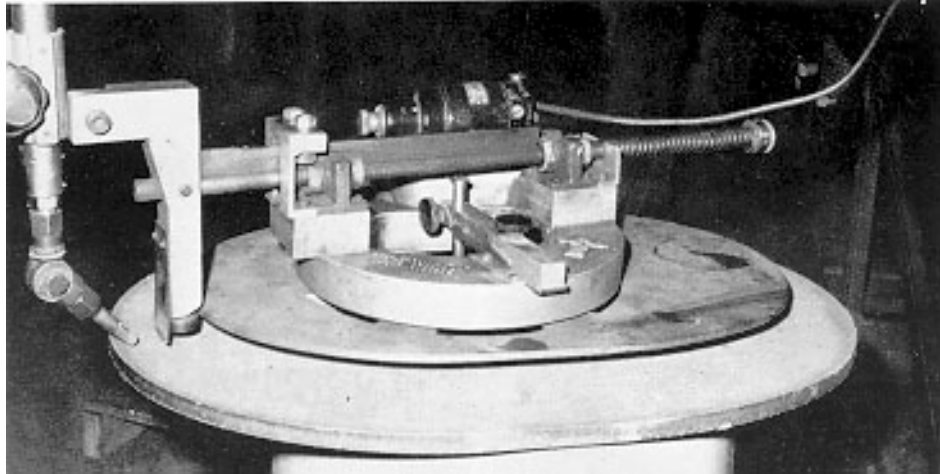


**Application:** Fabricating obround plates with a beveled edge to close tolerances for a nuclear application.

**Process:** Oxyfuel gas cutting.

**Equipment:** HOB-O modified by customer.

**Savings:** Outstanding results - at a much lower cost than machining.



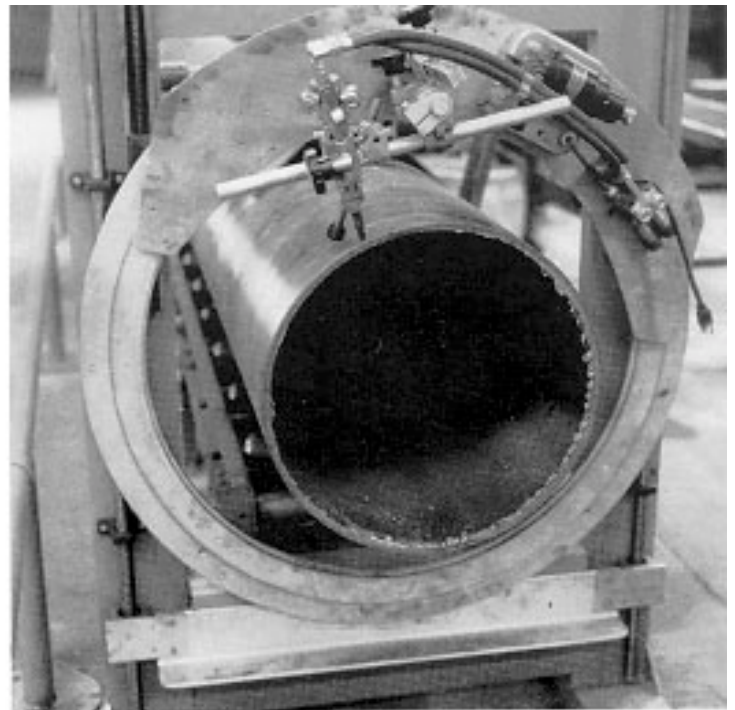
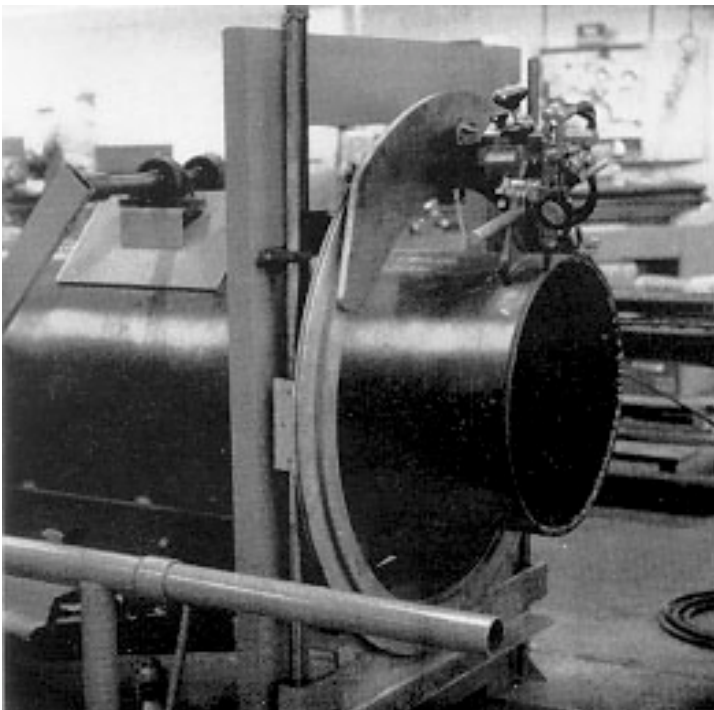
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**Application:** Make accurate, square cuts on pipes/vessels

**Process:** Oxyfuel gas cutting.

**Equipment:** CIR-5, with annular carriage, panograph mounted on fixture made by customer.

**Savings:** Fabricating costs reduced 48% - the machine paid for itself in 60 days.

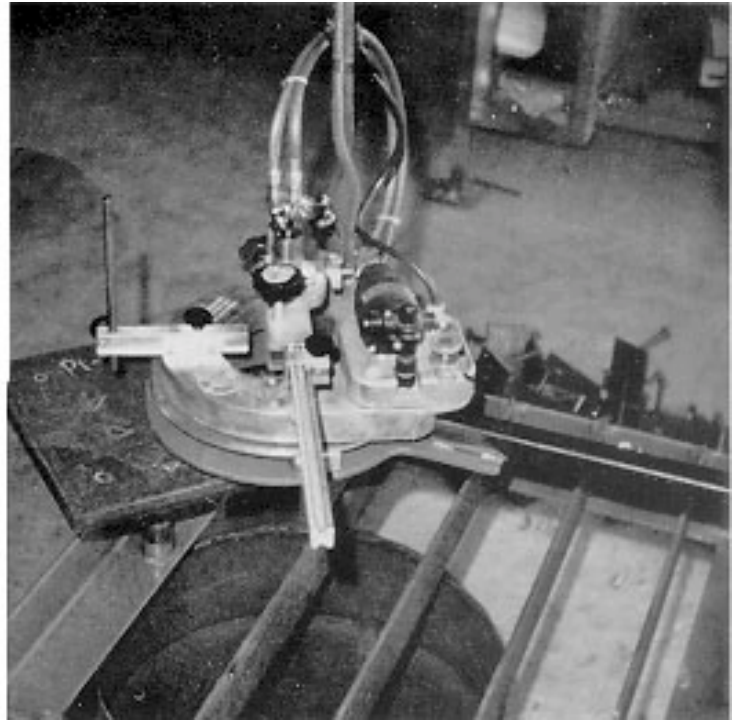
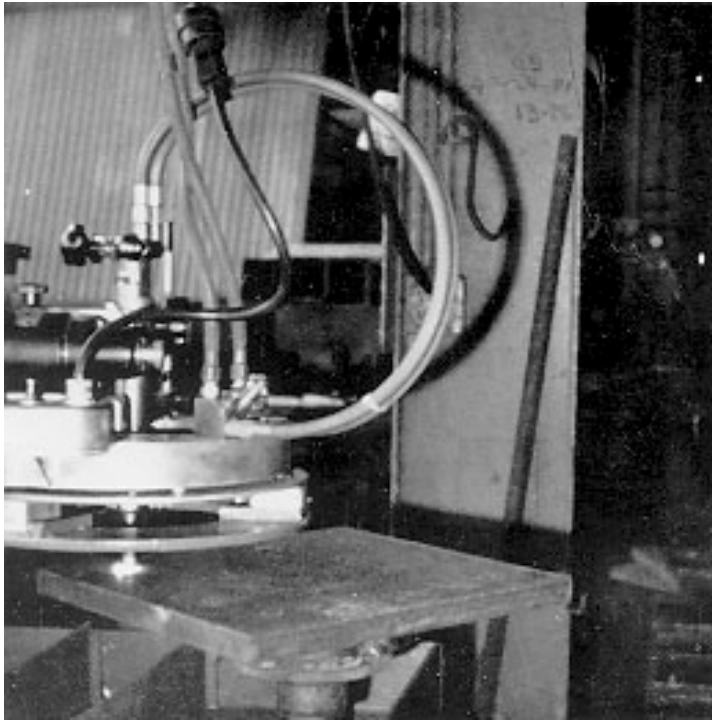


**Application:** Make numerous holes in steel plate faster and cheaper than drilling.

**Process:** Oxyfuel gas cutting.

**Equipment:** HOB-O mounted on fixture supplied by customer.

**Savings:** Flame cutting produced clean, accurate holes — 10 times faster than drilling.



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**Application:** Bevel ends of zirconium ingots prior to forging.

**Process:** Oxyfuel gas cutting.

**Equipment:** CIR-4 mounted on fixture made by customer.

**Savings:** Beveling time reduced from 16 to 2 hours (800% savings).



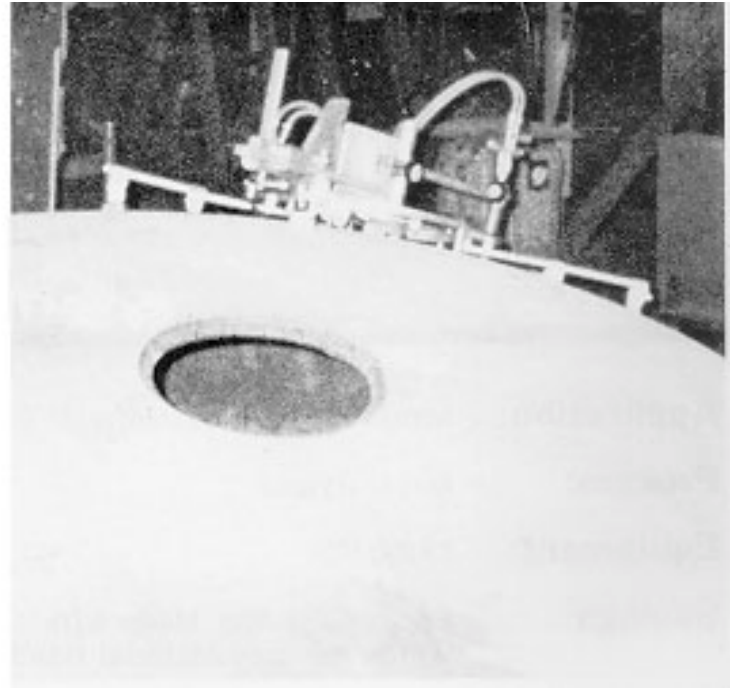
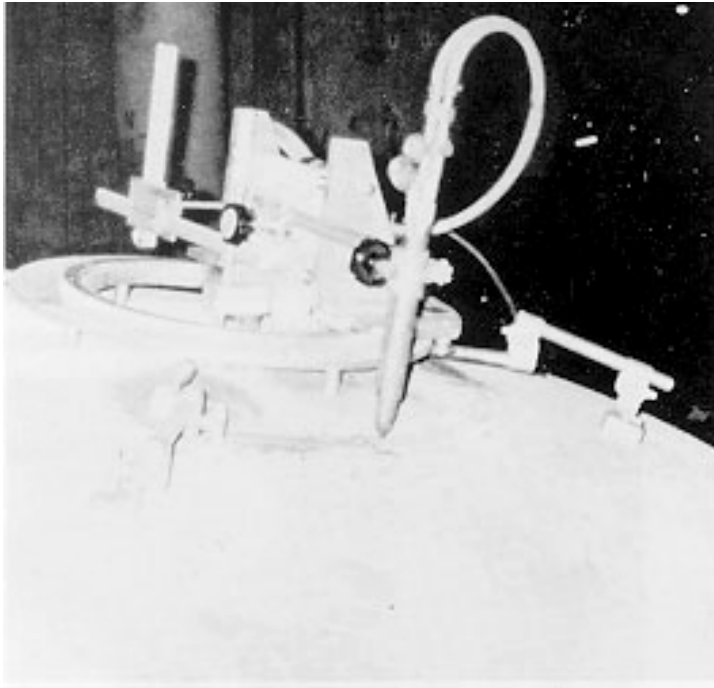


**Application:** Flame cut and bevel nozzle openings in thick hemispherical heads.

**Process:** Oxyacetylene.

**Equipment:** CON-3, CON-4 and CON-5

**Savings:** Flame cutting time reduced 50%. Total savings due to reduced handling and finishing - 70%.



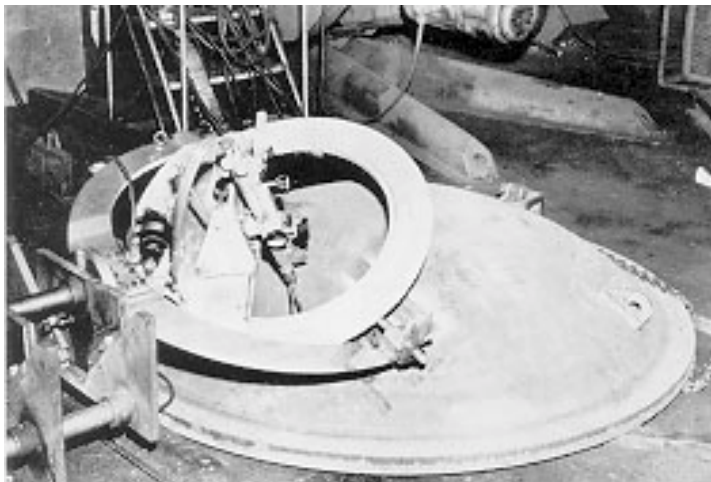
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**Application:** Cutting two large diameter holes on thick, dished heads at various angles from the spherical axis to accept mitered nozzles.

**Process:** Oxyfuel gas cutting.

**Equipment:** CON-4 mounted on special fixture made by customer.

**Savings:** Accurate cuts in position reduced material handling and welding guns.

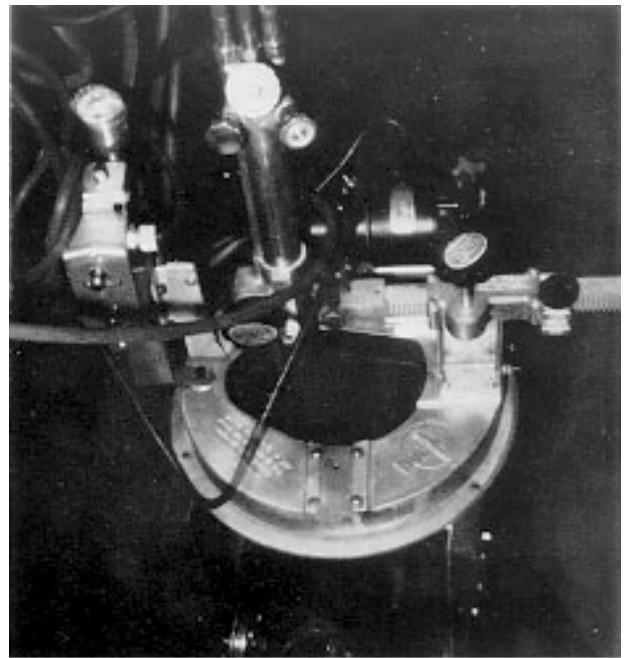


**Application:** Cutting holes in pipe.

**Process:** Oxyacetylene.

**Equipment:** HOB-O mounted on fixture supplied by customer.

**Savings:** Fast, accurate, clean flame cut holes.



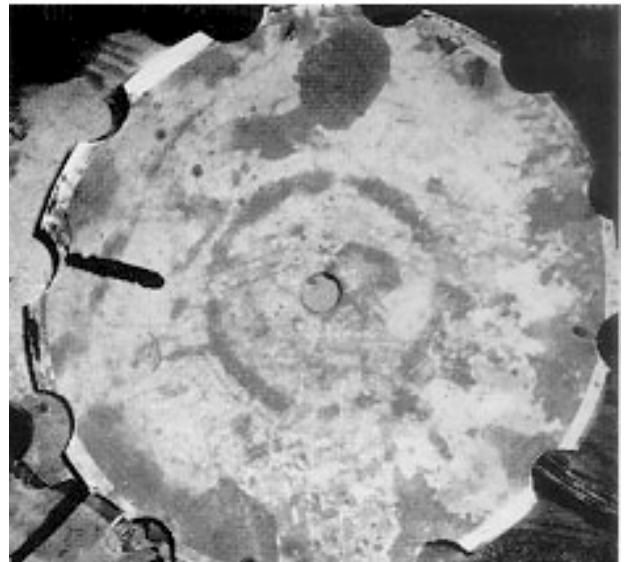
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**Application:** Manufacturing agricultural discs.

**Process:** Oxyacetylene.

**Equipment:** CIR-3303

**Savings:** Entire disc was made with CIR-3 which reduced material handling.



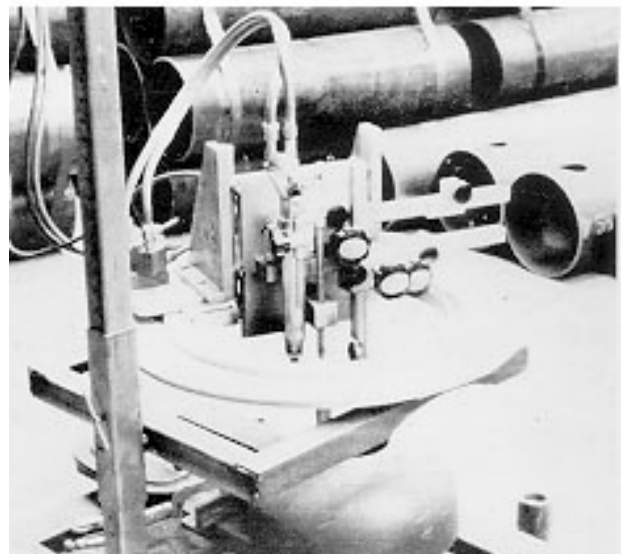
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**Application:** Cutting beveled holes in heads

**Process:** Oxyacetylene.

**Equipment:** CON-3303 mounted on customer's fixture.

**Savings:** Increased production 300%.





**Application:** Fabrication of manifold for ice skating rinks.

**Process:** Oxyacetylene.

**Equipment:** HOB-O mounted on customer fixture.

**Savings:** Accurate, clean holes, reduced welding time 40%



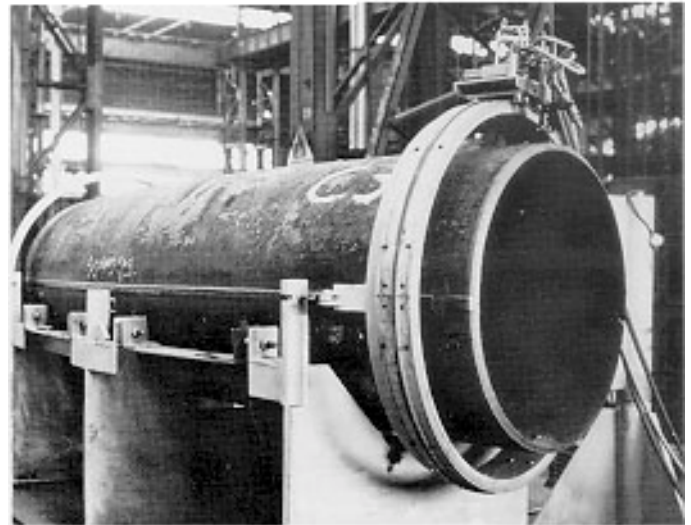
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**Application:** Fabricating 42" (1.06 m) diameter pipe elbows.

**Process:** MIG welding.

**Equipment:** ROL-O carriage, torch mounts, BRR-rails and fixture made by customer.

**Savings:** 30% per elbow over manual method.



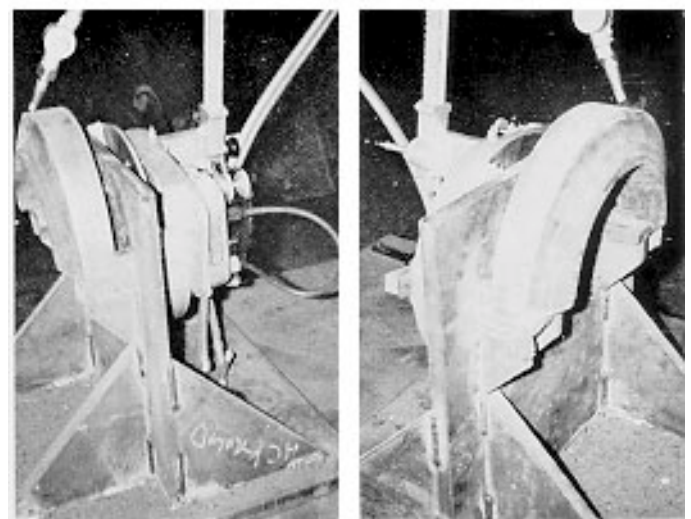
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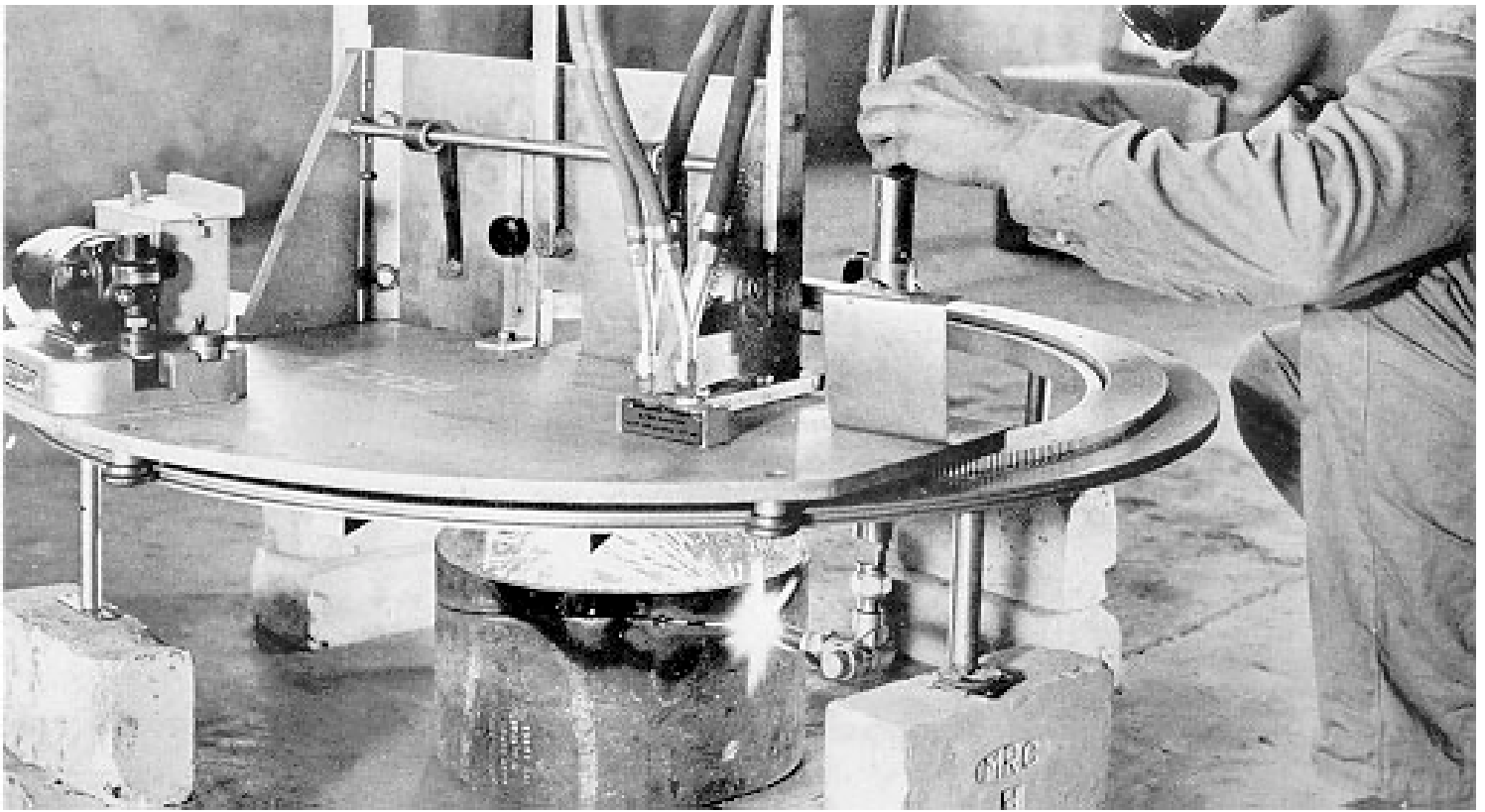
**Application:** Cut a 30 degree bevel on 14" (355 mm) outside diameter, 8" (200 mm) inside diameter, 3" (75 mm) thick disc.

**Process:** Oxyacetylene.

**Equipment:** HOB-O with torch and adjustable tip adaptor and Q.A. manifold on fixture designed by customer.

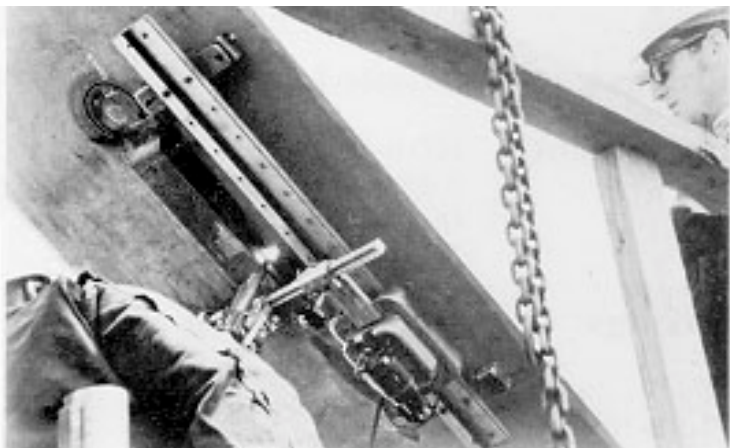
**Savings:** High quality cut — in a short time.





- Application:** Make saddle contoured cuts on pipe.
- Process:** Oxyacetylene.
- Equipment:** CON-5 with 1:2 ratio bevel gear set mounted by customer.
- Savings:** 8 man hours per assembly.

- 
- Application:** Overhead cutting to remove defective hanger bars on suspension bridge.
  - Process:** Oxyfuel gas cutting.
  - Equipment:** HOB-O and BUG-O straightline kit.
  - Savings:** Precise, smooth cuts, reduced cleanup and subsequent welding of new components.



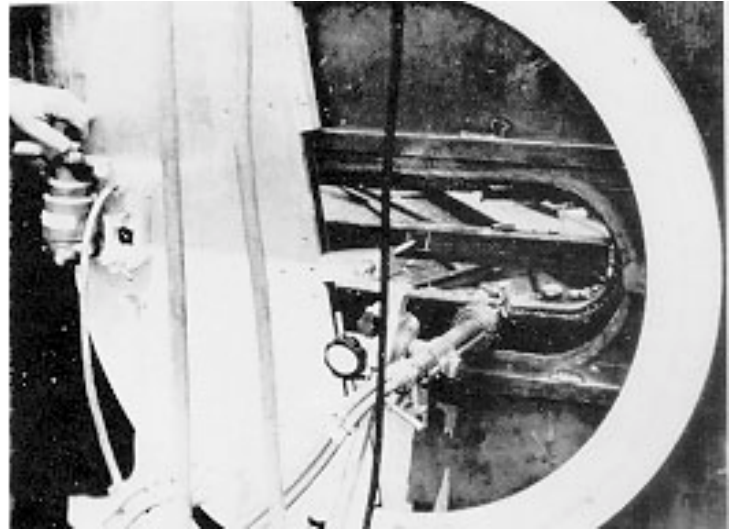
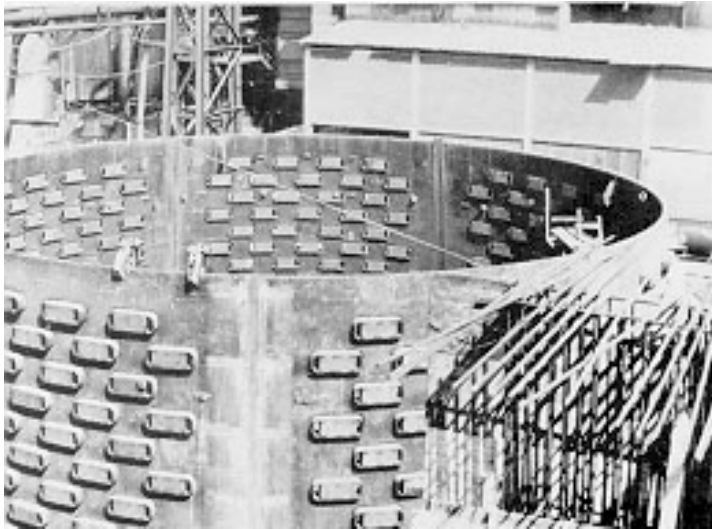


**Application:** Cutting obround holes in blast furnace shell.

**Process:** Oxyfuel gas cutting.

**Equipment:** CIR-5 with template kit.

**Savings:** 30% compared to manual cutting.



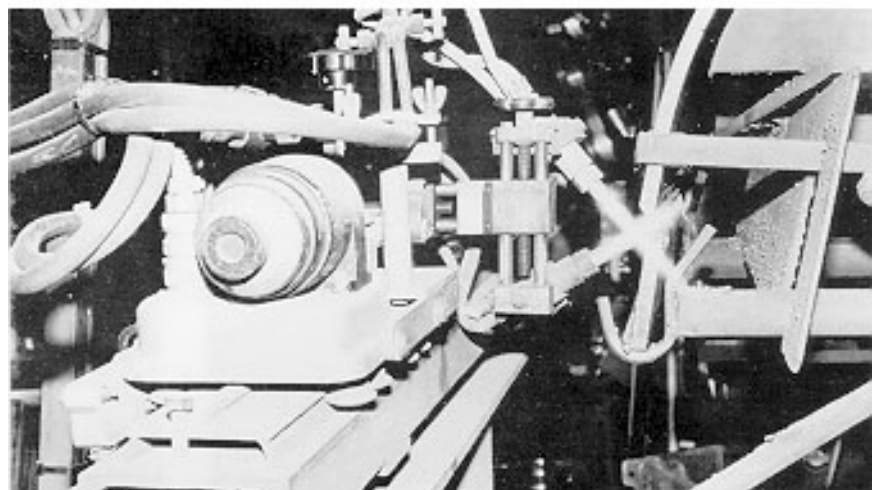
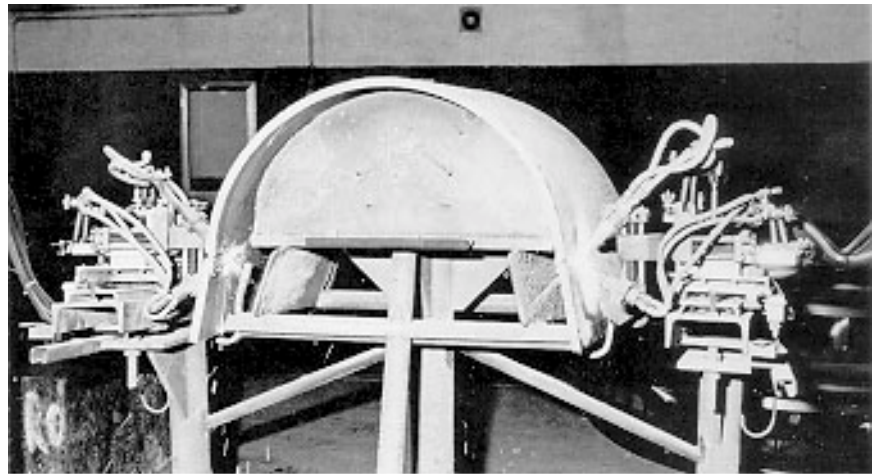
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**Application:** Cutting conical section from rolled plate.

**Process:** Oxyacetylene.

**Equipment:** ROL-O Carriages and ARR-rails mounted on customer's fixture.

**Savings:** 80% less costly than manual cutting.

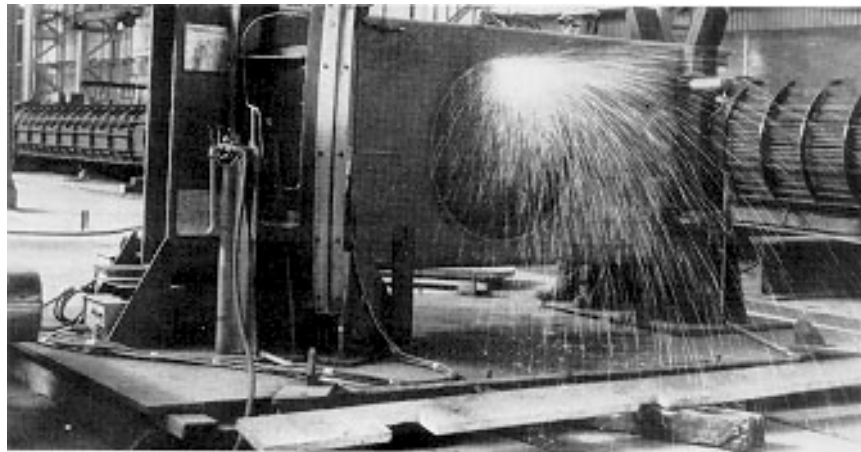
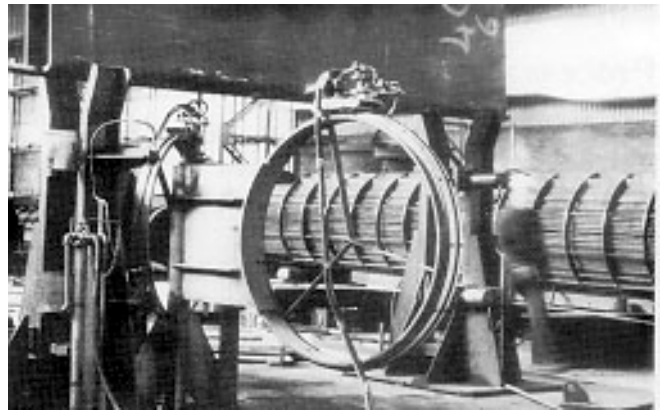


**Application:** Fabrication of large gate valves.

**Process:** Oxyfuel gas cutting.

**Equipment:** Two ring rails and two ROL-O carriages mounted on customer's fixture.

**Savings:** 100% compared to manual cutting.



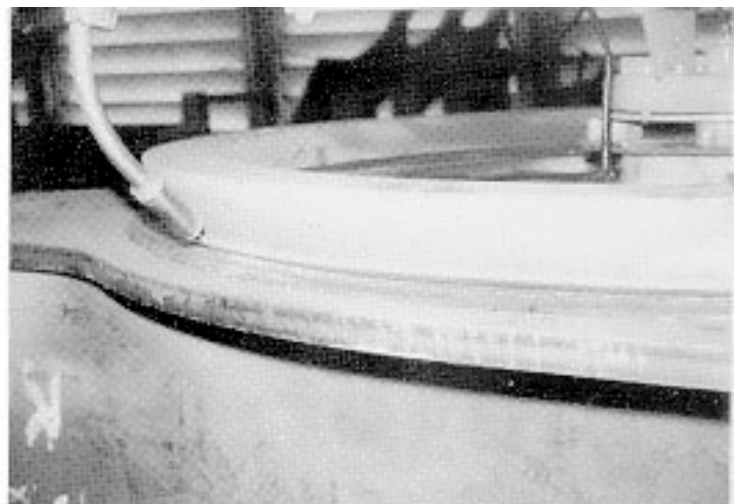
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**Application:** Fillet welding I.D. and O.D. of rings.

**Process:** Flux cored arc welding.

**Equipment:** HOB-O with all-position clamp and right angle rack.

**Savings:** Production increased 300%.



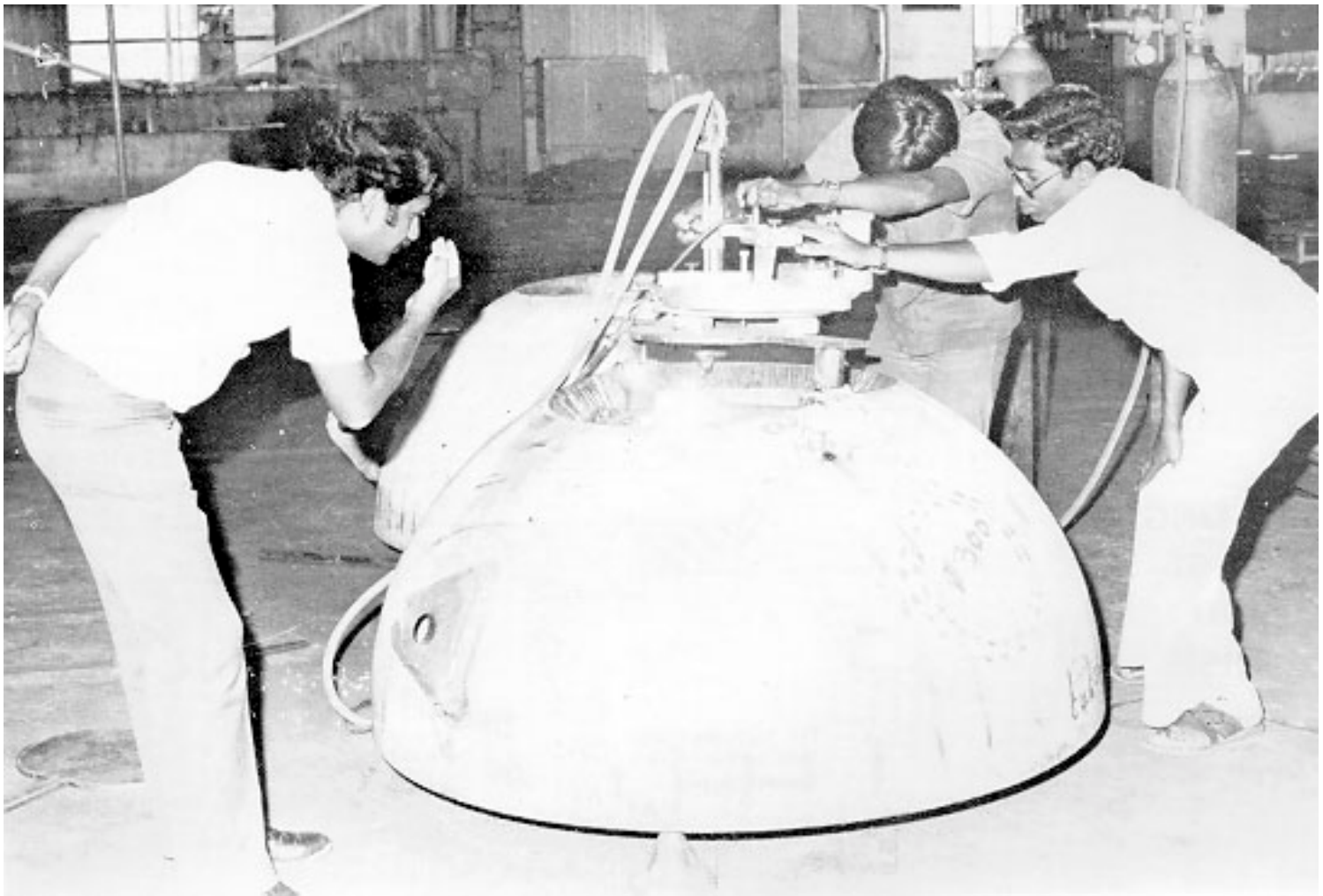


**Application:** Cutting obround holes in a hemisphere.

**Process:** Oxyfuel cutting.

**Equipment:** HOB-O with adjustable tip adaptor.

**Savings:** Substantial reduction in grinding and machining time.

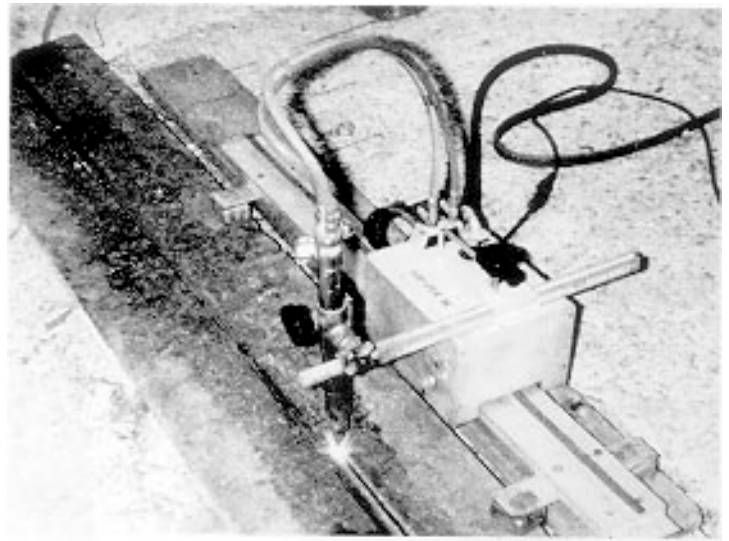


**Application:** Replacing expansion joints on bridges.

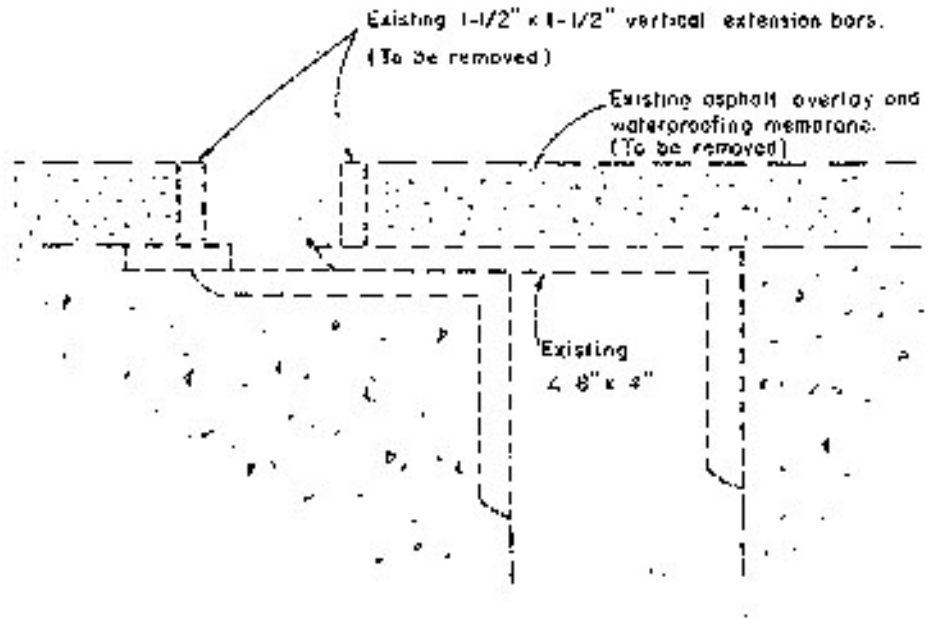
**Process:** Oxyfuel gas cutting.

**Equipment:** GO-FER Kit, Smith torch, ARR-rail and magnets.

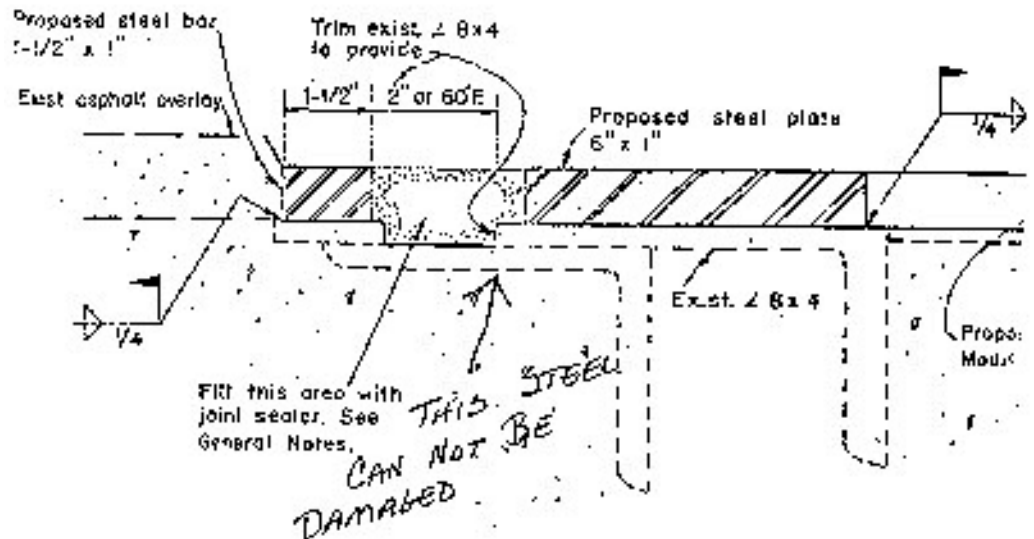
**Savings:** Satisfied customers (bridge owners) and time and money savings for the contractor.



PROPOSED  
BRIDGE  
END  
FINISH



EXISTING  
BRIDGE  
END  
FINISH







# Applications

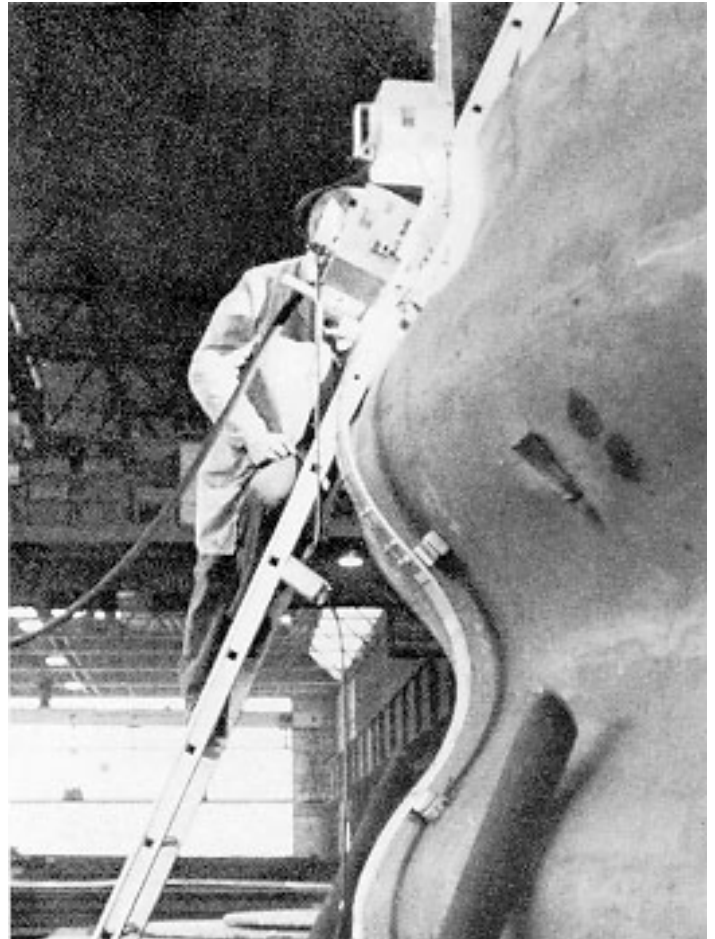
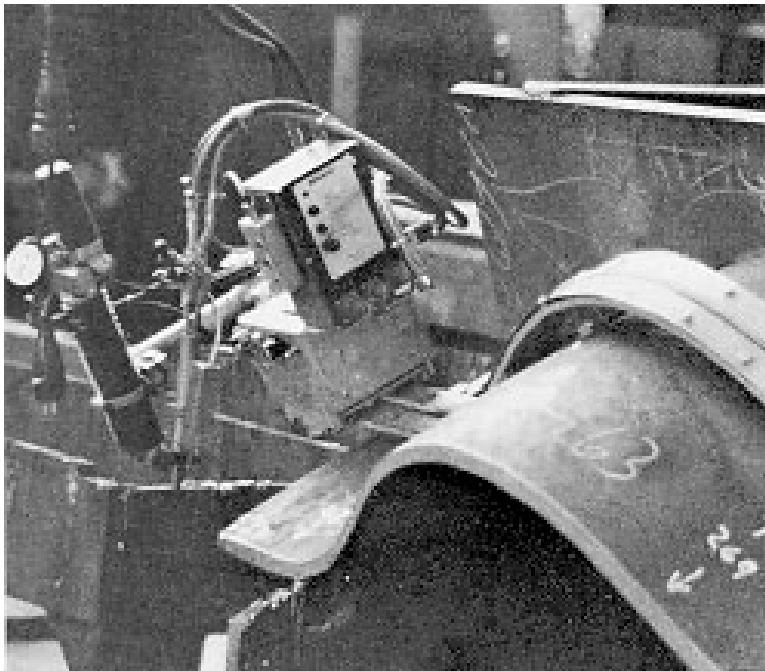
## Fixturing For Special Cutting And Welding

**Application:** To bevel, trim (20°) pressed steel plates of special corrugated shape, for tube segments in construction of subway system tunnel.

**Process:** Oxyfuel cutting.

**Equipment:** Super-Flex rail bolted to aluminum template, Super-Flex carriage, height sensing control.

**Savings:** Mechanized a job impossible to do manually at a cost of \$13,000.00 compared to \$130,000.00 for a robotic system. Also realized an 80% reduction in time.



**Application:** Finish trim square section of 12 ft. (3.7 m) diameter sphere.

**Process:** Oxyfuel flame cutting.

**Equipment:** BUG-O DC II, special bolts to clamp rail to plate by customer.

**Savings:** Obtained perfect uninterrupted cuts.



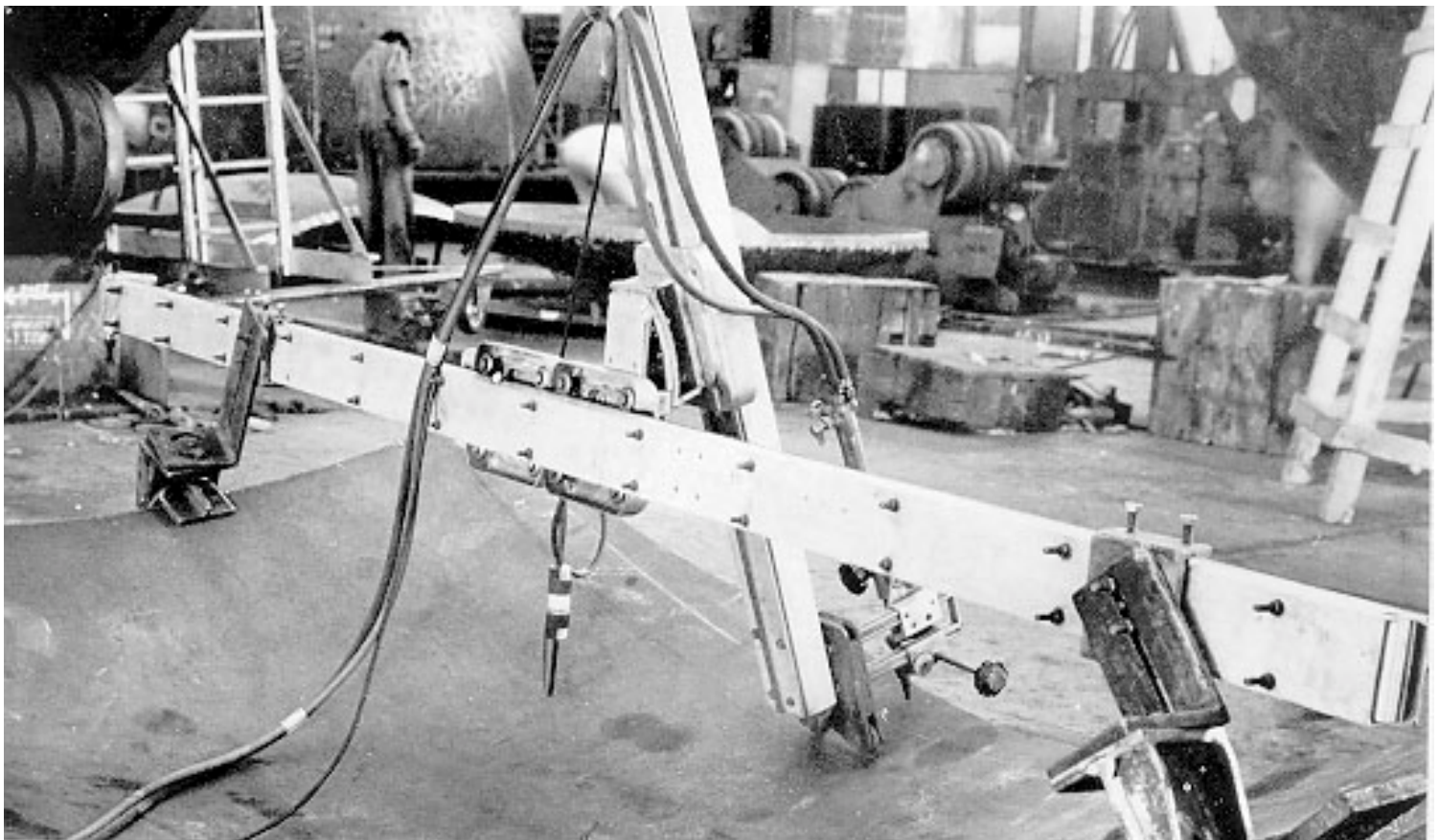
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**Application:** Trimming sides of gore sections of dished plate heads with hemispherical, torispherical or ellipsoidal profiles.

**Process:** Oxyfuel flame cutting.

**Equipment:** MUG-O rail, BUG-O drive, trailer carriage, torchholder, racks, rackholder - special clamps, tiltable sliding mount by customer.

**Savings:** Reduced grinding and assembly time, saved 8 hours per section, \$6,500.00 per year.



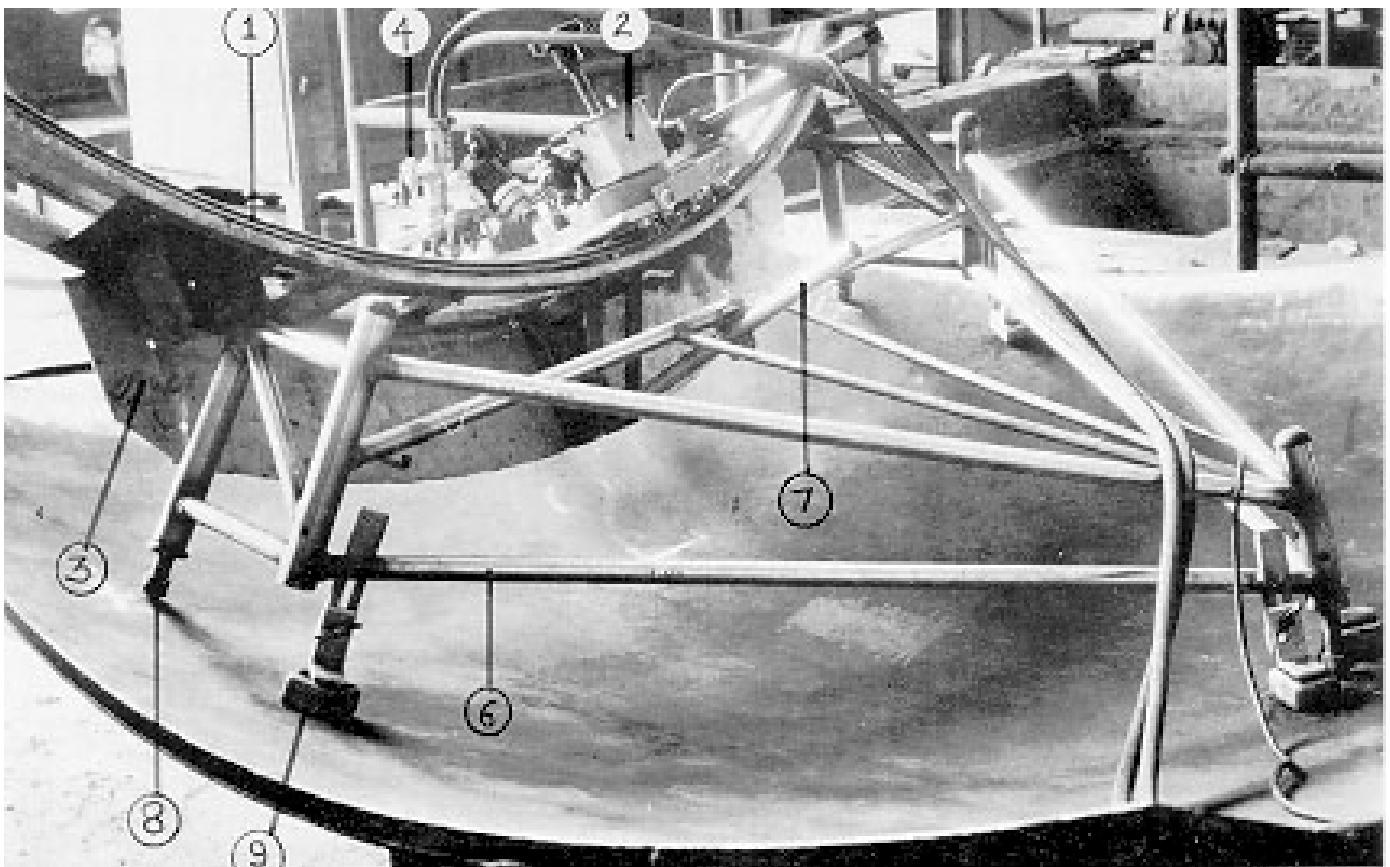
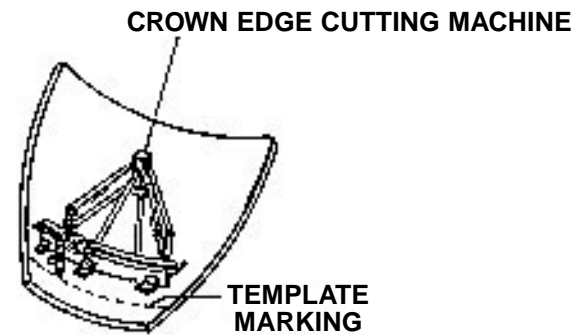
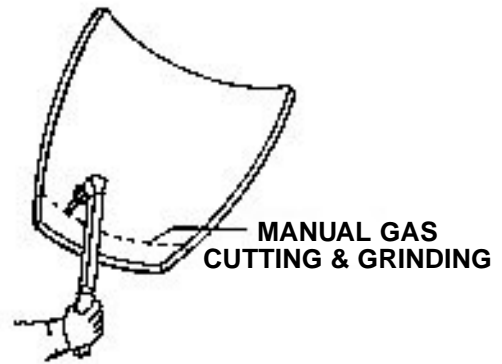


**Application:** Cutting and trimming crown to petal joints for dished ends.

**Process:** Oxyfuel flame cutting.

**Equipment:** ROL-O carriage, flex rail, torchholder, panograph torch floater, rod clamp, (4) magnet feet and fixture by customer.

**Savings:** 16 man hours (67%) per dished end amounting to savings of \$146.00 per dished end.



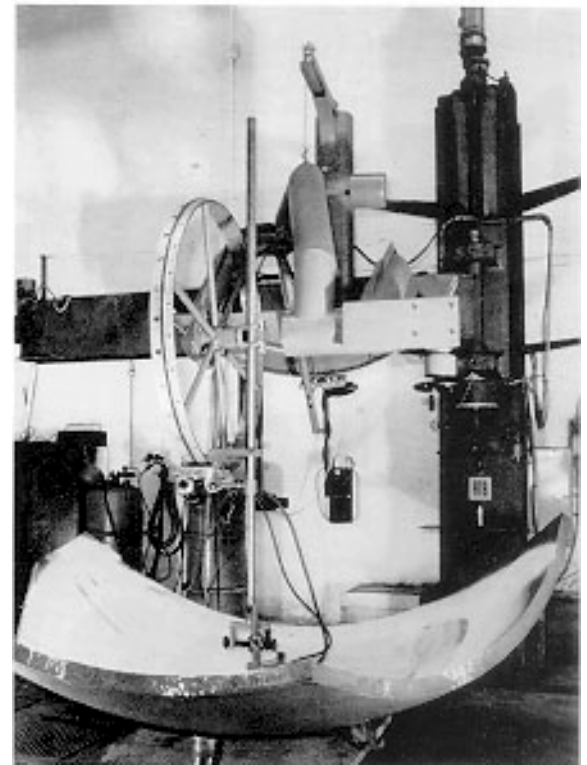
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|---------------------------|----------------------------|-------------------|
| 1. BUG-O Flexible Rail    | 4. Torch Assembly          | 7. Telescopic Arm |
| 2. ROL-O carriage         | 5. Panograph Torch Floater | 8. Jack Screws    |
| 3. Aluminum Flapper Plate | 6. Frame                   | 9. BUG-O Magnet   |

**Application:** Cutting bevels for welding hemisphere sectors for spheres and heads.

**Process:** Oxyfuel cutting.

**Equipment:** Customer's special fixture designed around BUG-O equipment; ROL-O carriage and bent rails.

**Savings:** Reduced preparation time 90%, increased productivity.



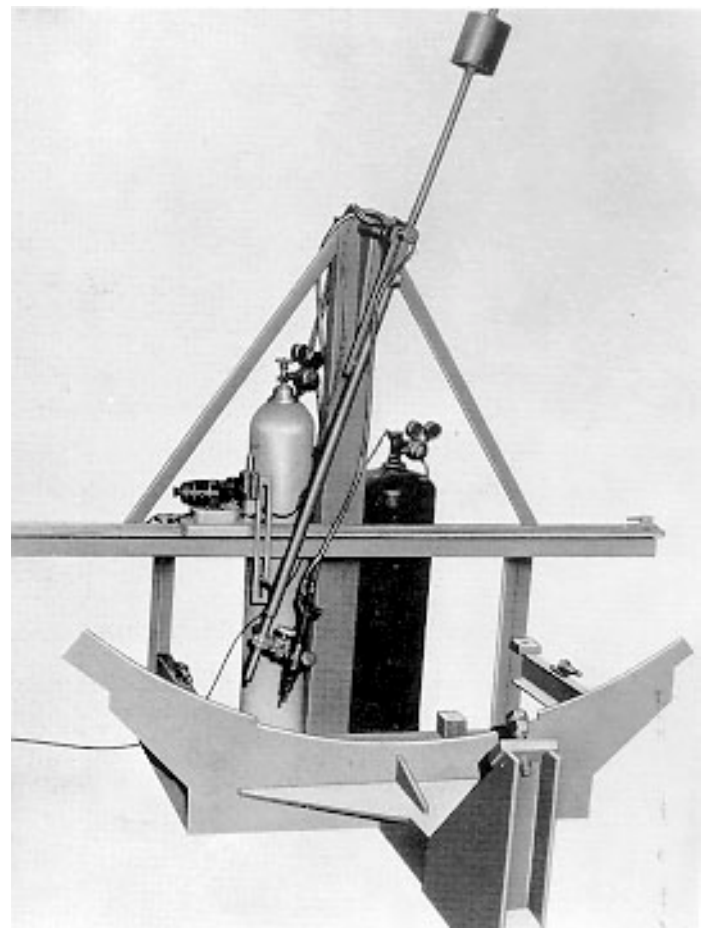
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**Application:** Produce 10 ft. (3.1 m) diameter hemispherical heads fabricated from 4 ft. (1.2 m) formed circular piece and six gore sections with excess material on edges.

**Process:** Oxyfuel gas cutting.

**Equipment:** BUG-O carriage and drive unit, rail, torchholder, clamp, customer's fixture.

**Savings:** Excellent gore sections produced quickly.



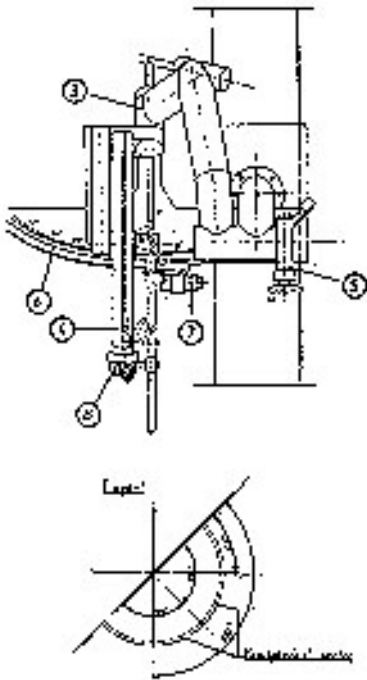
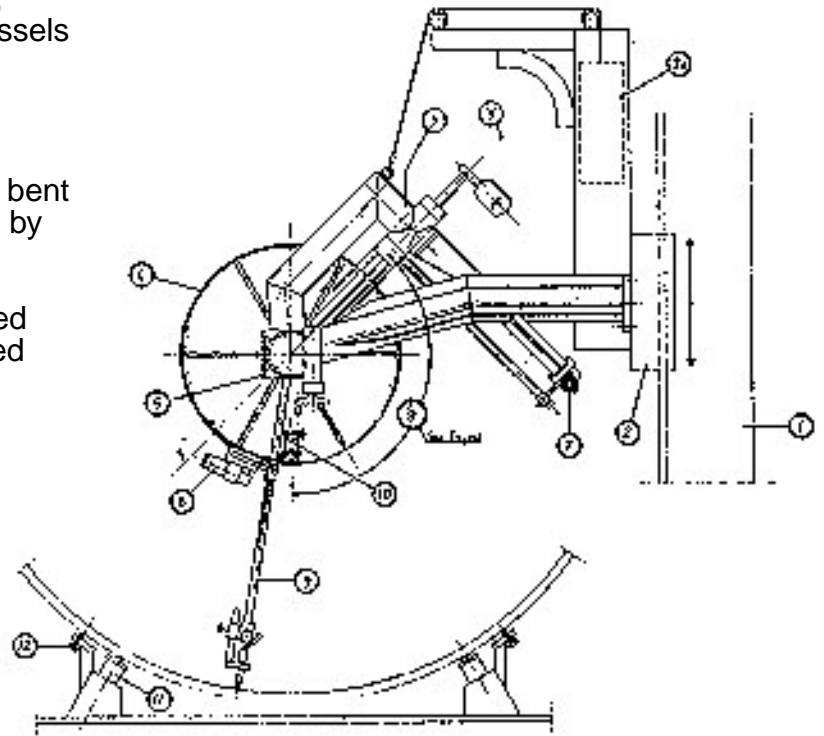


**Application:** Constructing large hemispherical, elliptical and welded heads for vessels and reactors.

**Process:** Oxyfuel gas cutting.

**Equipment:** BUG-O carriages and drive units, bent rail, rigid rail with fixture designed by customer.

**Savings:** 70% in labor time, greatly improved accuracy of preparation, eliminated template construction.

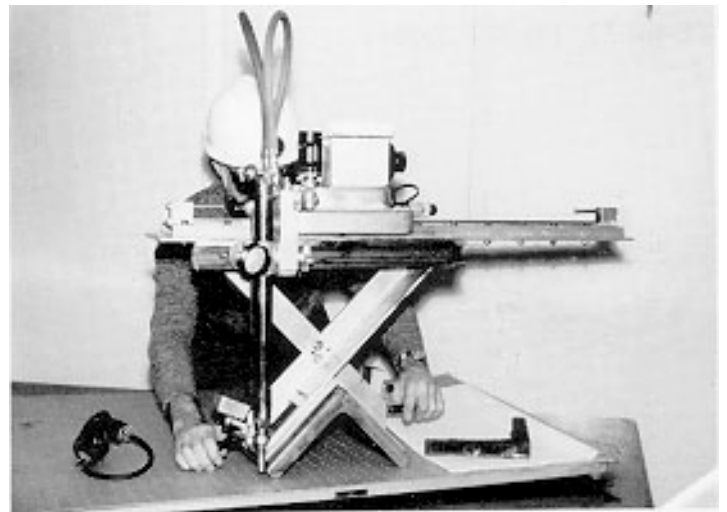


**Application:** Cutting heavy angles.

**Process:** Oxyfuel cutting.

**Equipment:** BUG-O DC III with limit switch kit, rail, torchholder, mounted on customer's fixture.

**Savings:** Cutting time reduced 50%, set up time reduced 75%, reduction of slag-blow, grinding eliminated.

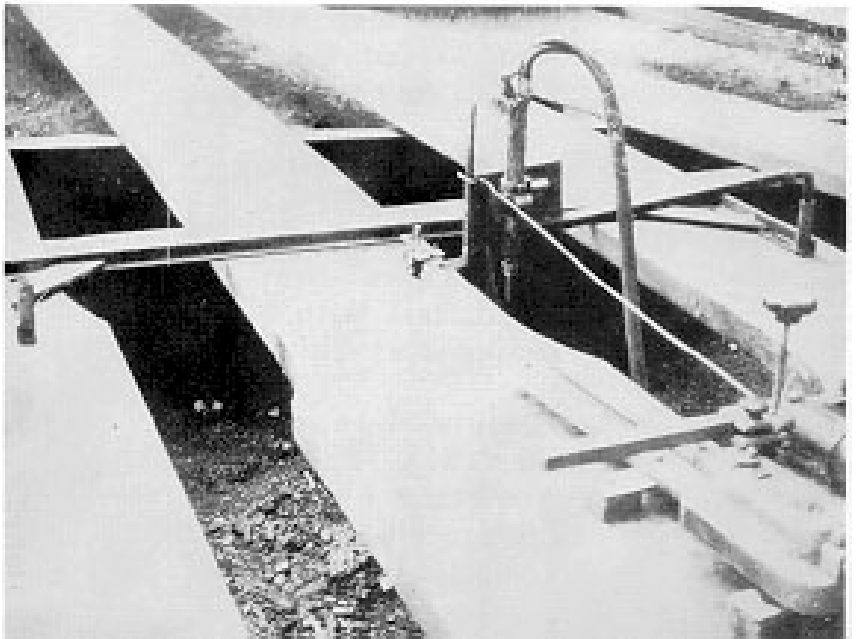


**Application:** Cutting transition radius on flange plates.

**Process:** Oxyfuel flame cutting.

**Equipment:** BUG-O Straightline Kit, 3-Hose Manifold, Rail mounted on customer's fixture.

**Savings:** Mechanized fixture produced smooth, uniform, accurate transition from narrow to wider flange with minimum finishing required.



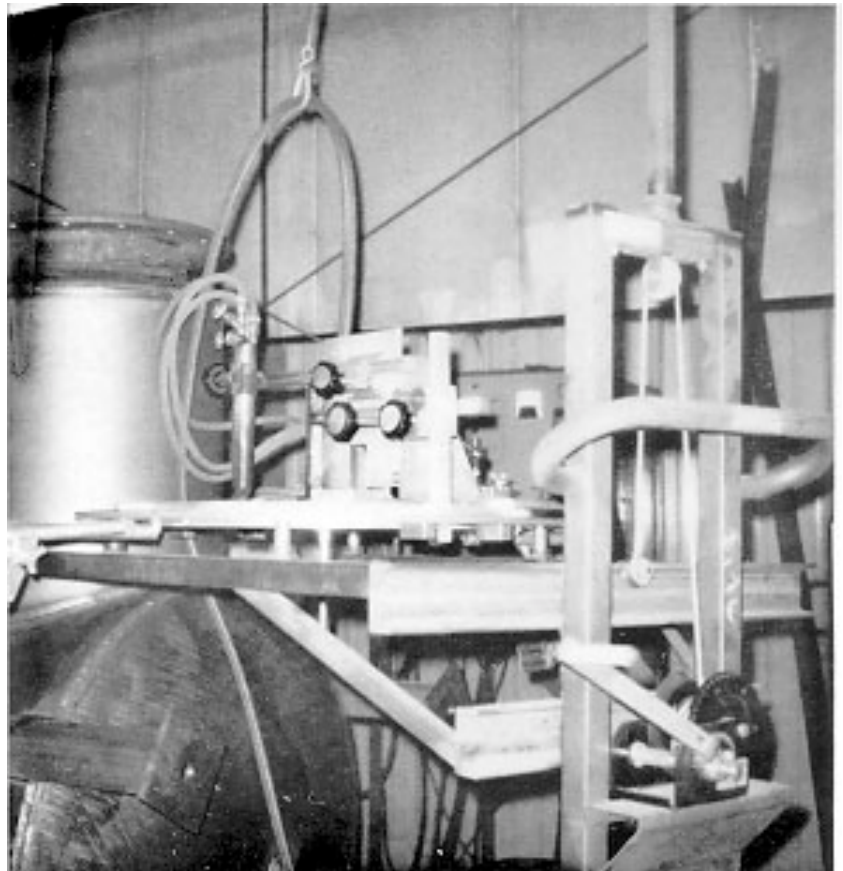
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**Application:** Preparation for a weld around 18" to 72" (457 mm to 1829 mm) diameter tube-to-tube contour, in muffler fabrication.

**Process:** Oxyfuel flame cutting.

**Equipment:** CON-O mounted on customer's fixture.

**Savings:** Perfect fit-ups requiring only one pass to weld in the nozzle and only one operator to make the hole.



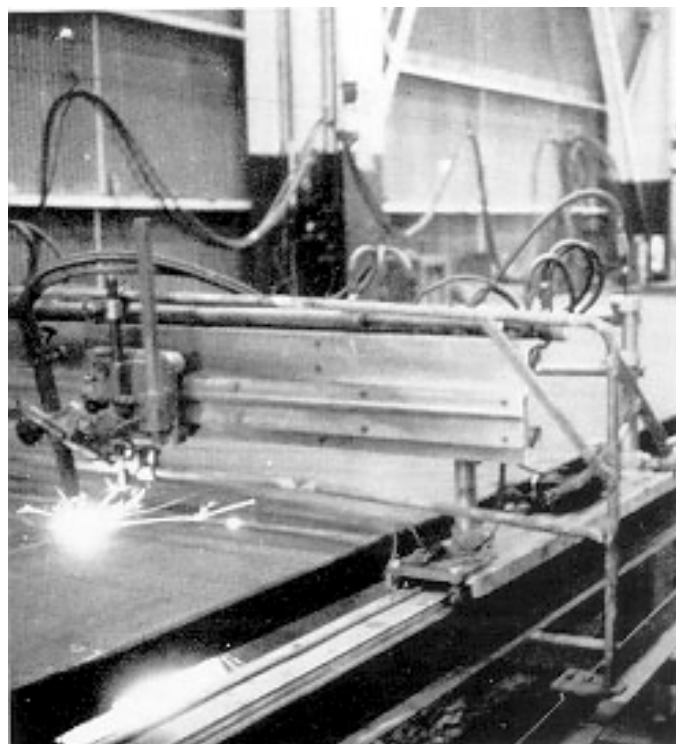
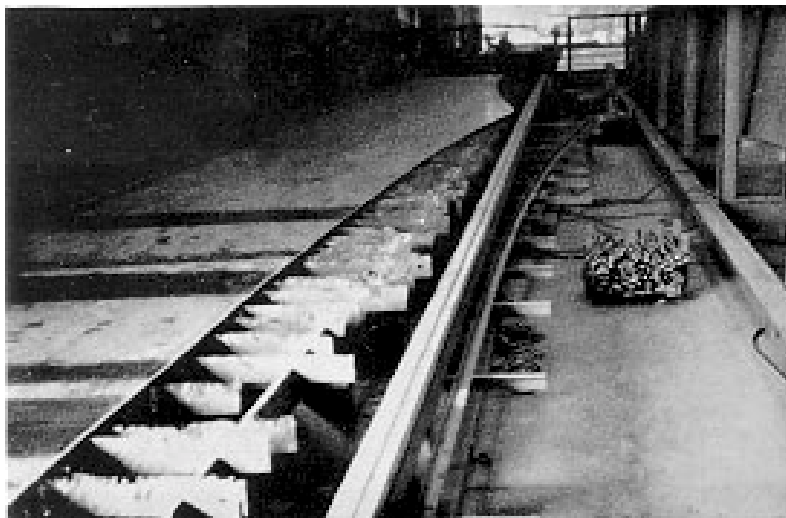


**Application:** Cutting fish belly webs for bridges.

**Process:** Oxyfuel cutting.

**Equipment:** MUG-O with template follower, 115 ft. (35 m) template by customer.

**Savings:** Eliminated 4 hours layout time, burning time reduced from 8 hours to 6 hours, saving 10 hours per girder.

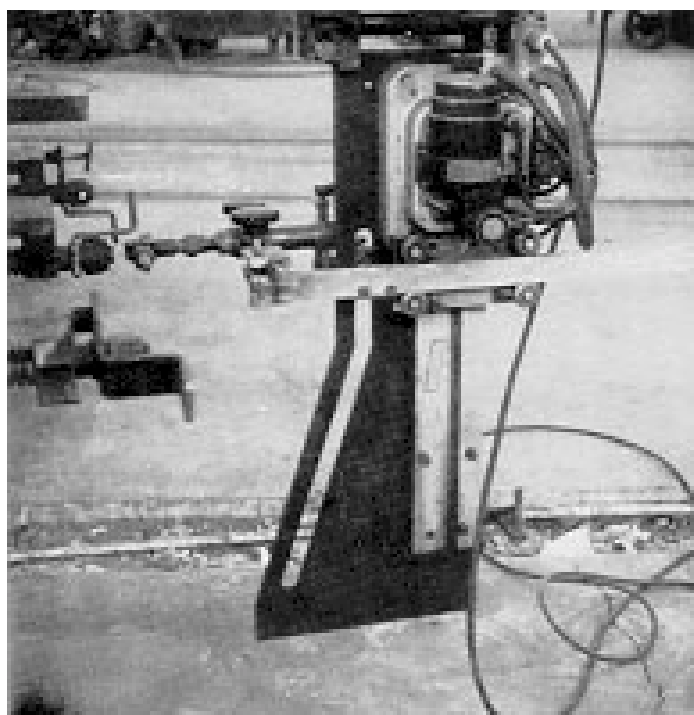
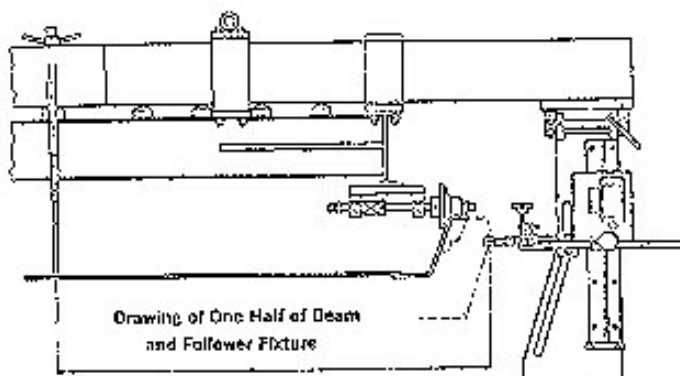


**Application:** Cut-outs for adding support gussets to increase width of railroad cars.

**Process:** Oxyfuel cutting.

**Equipment:** BUG-O Drives, Right Angle Rack, Rack Rider, Torchholder, Manifold, Heavy Duty Rail.

**Savings:** All gussets uniformly cut with little rework, precise car width established, new side sill easily installed, significant production increase and reduced manpower costs.

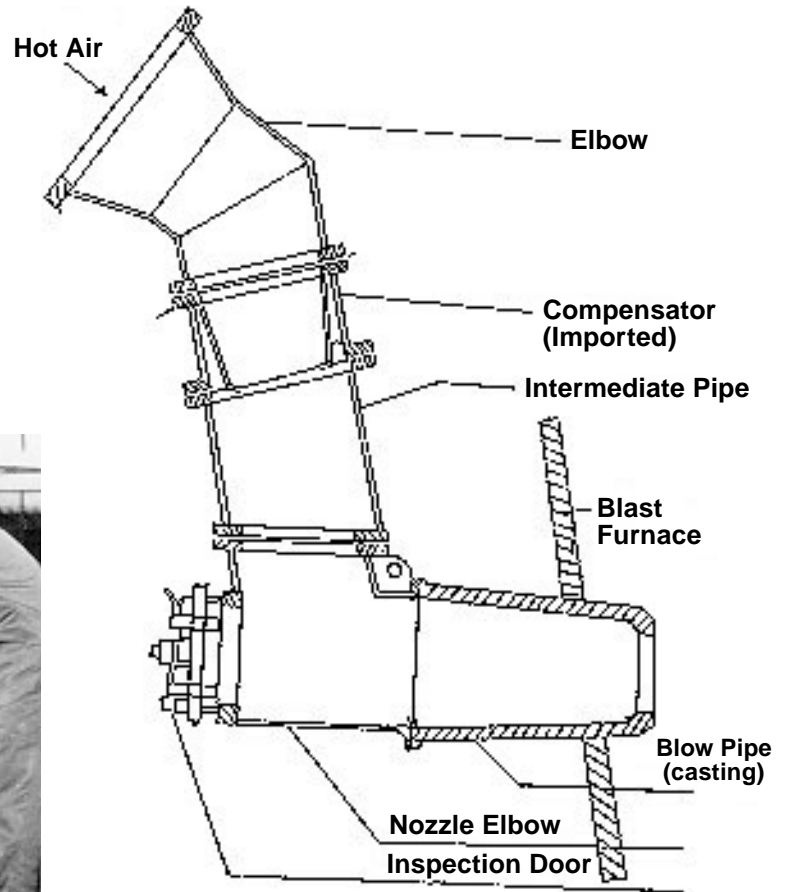


**Application:** Flame beveling tubular sections.

**Process:** Oxyfuel cutting.

**Equipment:** HOB-O

**Savings:** 72% over manual cutting, and eliminated grinding and repairing.

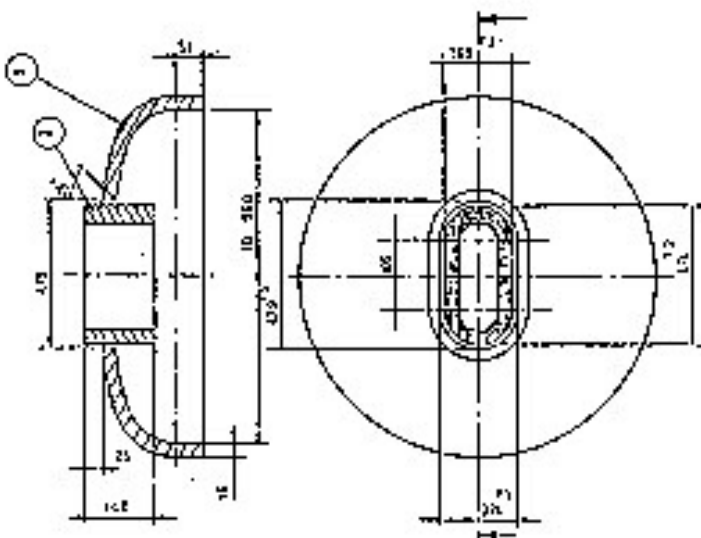
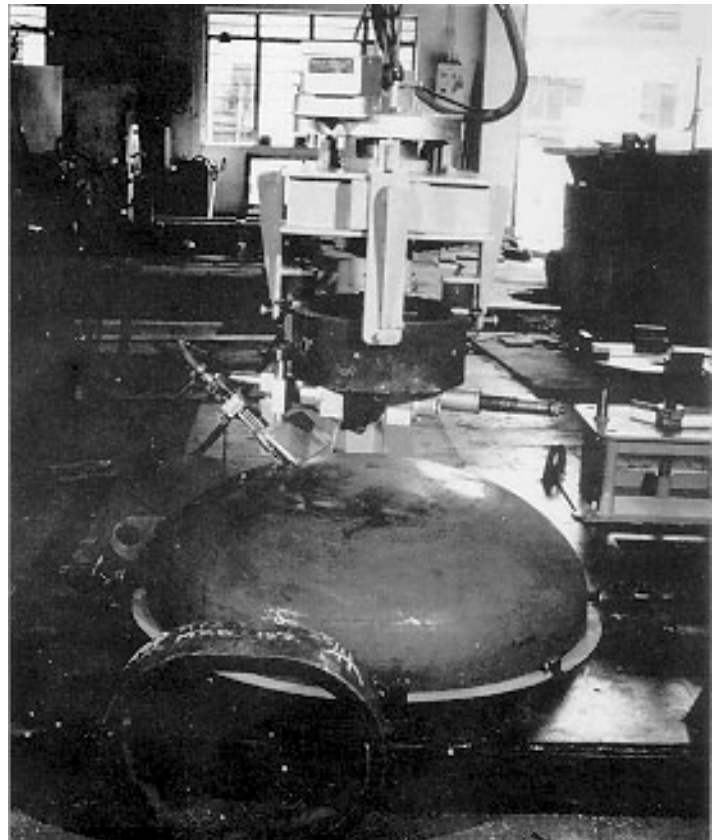


**Application:** Flame cutting elliptical holes.

**Process:** Oxyfuel cutting.

**Equipment:** HOB-O mounted on customer's fixture.

**Savings:** Flame cutting time increased ten times with semi-skilled operator.

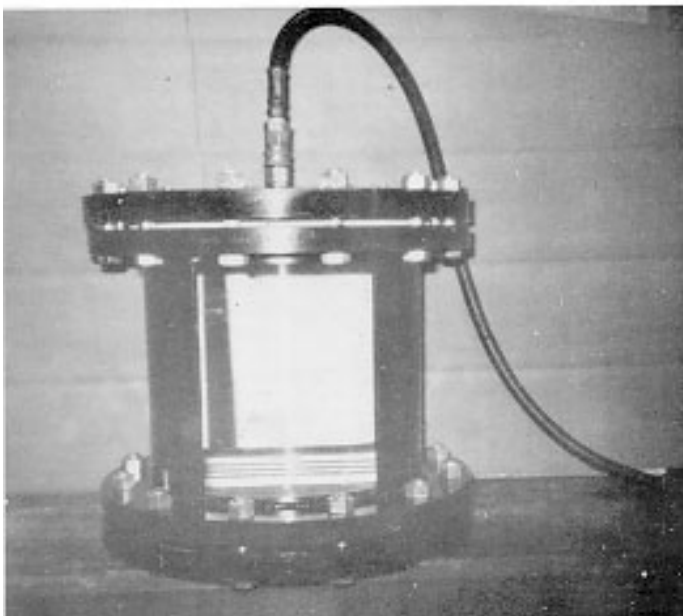
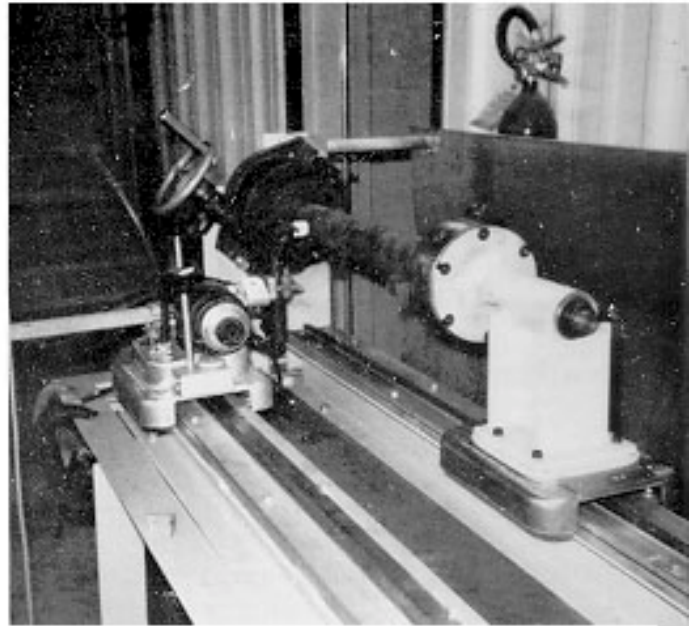
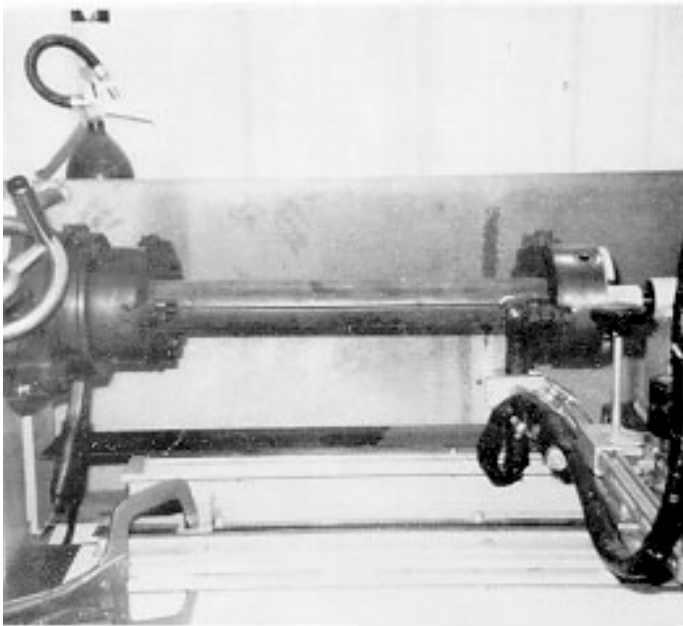
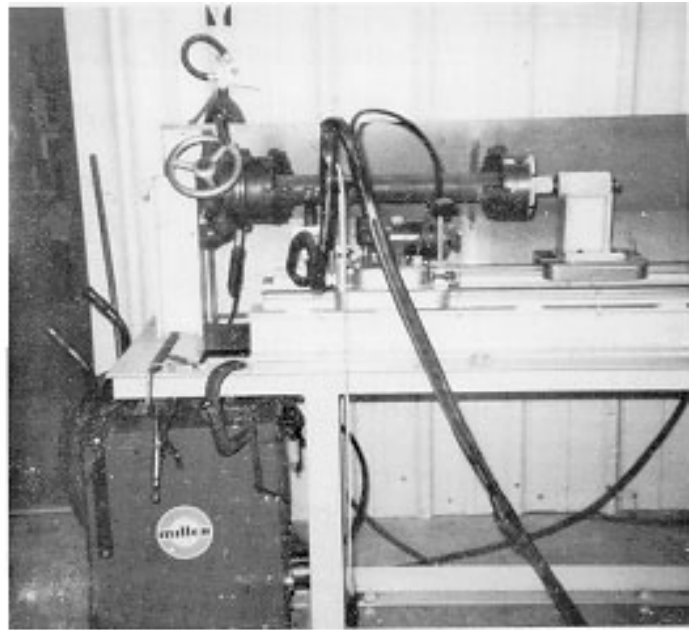


**Application:** Plasma cutting replaces milling operations.

**Process:** Plasma cutting.

**Equipment:** BUG-O DC III, trailer and rails.

**Savings:** 300% increase in production.



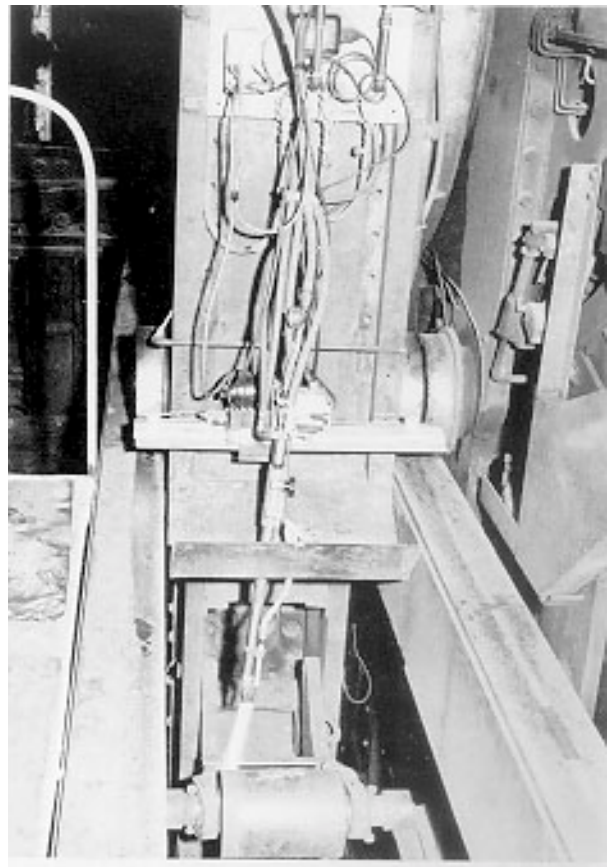
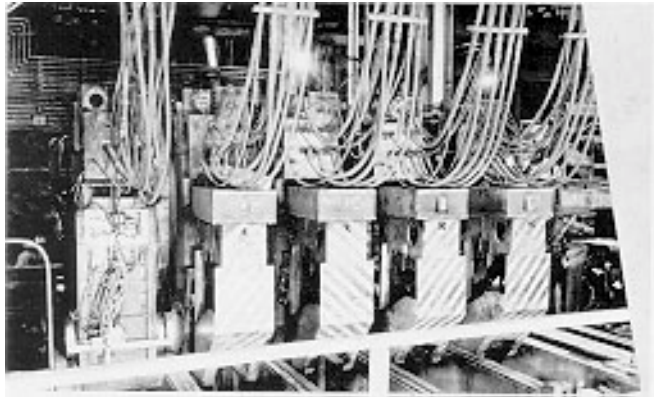


**Application:** Cutting billets on continuous strand caster.

**Process:** Oxyacetylene flame cutting.

**Equipment:** BUG-O DC IV with accessories and special controls mounted on customer's fixture.

**Savings:** Quality of cut improved eliminating shear-drag, production increased.



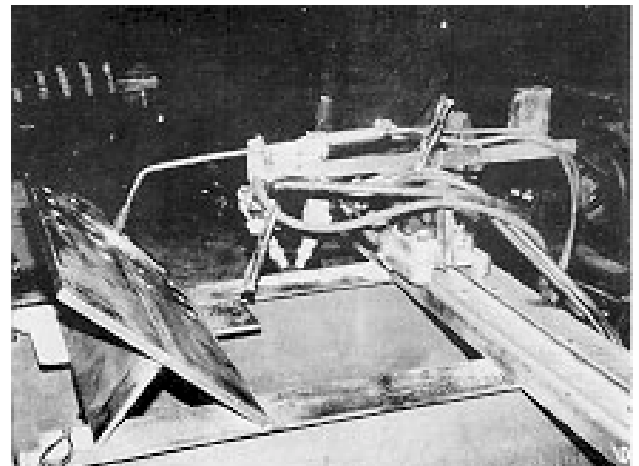
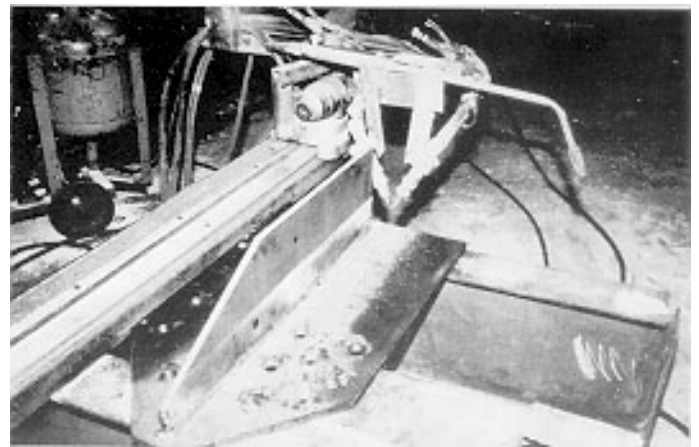
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**Application:** Continuous welding of structural stiffeners.

**Process:** Semiautomatic sub arc welding oxyfuel heating.

**Equipment:** BUG-O General Welding Kit on customer's fixture.

**Savings:** High quality welds with minimum distortion saved 1300 man hours.





# Applications

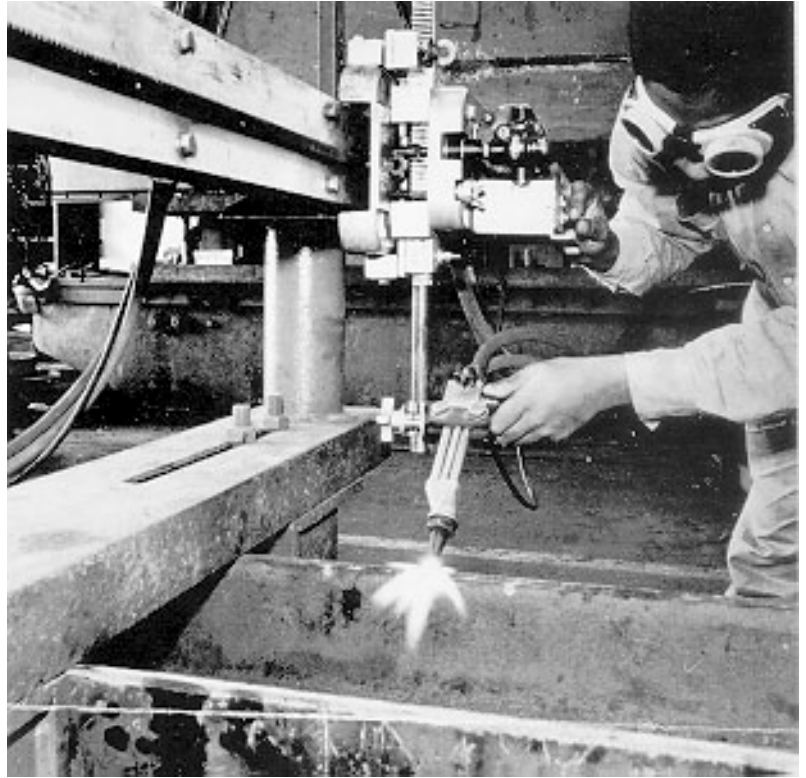
## Beam / Column Cutting

**Application:** Fabricate "I" beams maintaining uniform length and square cut.

**Process:** Oxyfuel gas cutting.

**Equipment:** BUG-O General Welding Kit, Rack, Rackholders, Cam Clutch, modification to drive by customer.

**Savings:** Direct savings of 61% over manual cutting, reduction in handling, minimized grinding, touch-up and set up.

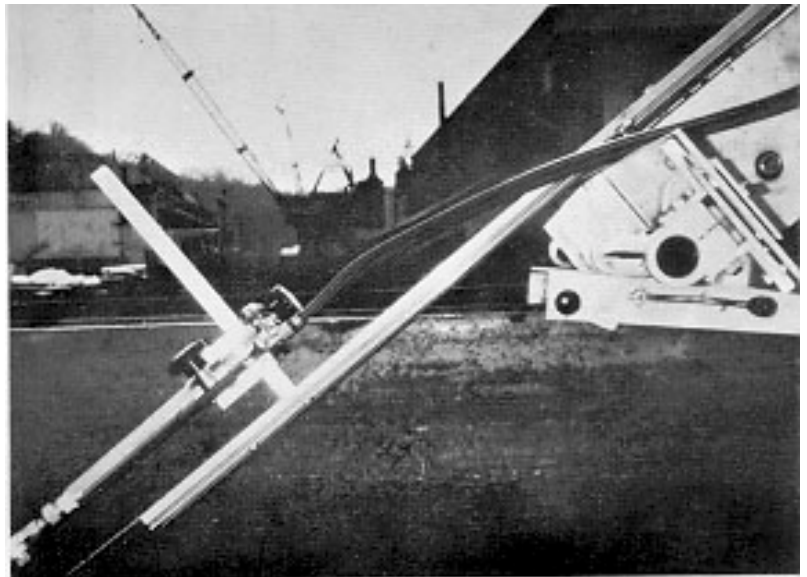


**Application:** Cut 580 angles on flange section of "I" beams.

**Process:** Oxyfuel machine burning.

**Equipment:** Beam Bug, Beam Rail, Special Rail on Vertical Travel, riser supplied by customer.

**Savings:** Achieved desired results with simple set up.

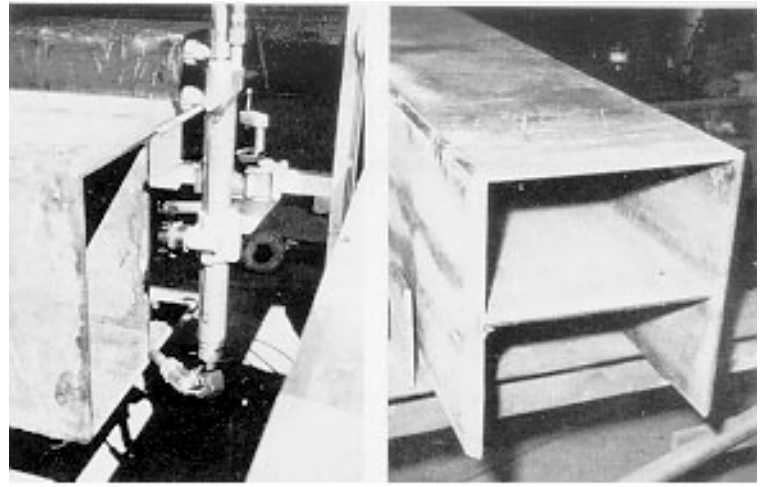


**Application:** Beveling lower ends of structural watertight columns.

**Process:** Oxyfuel flame beveling.

**Equipment:** Beam Bug mounted on tripod type jig designed by customer.

**Savings:** Time reduced from 1.4 hours to 18 minutes, plus achieving high accuracy.



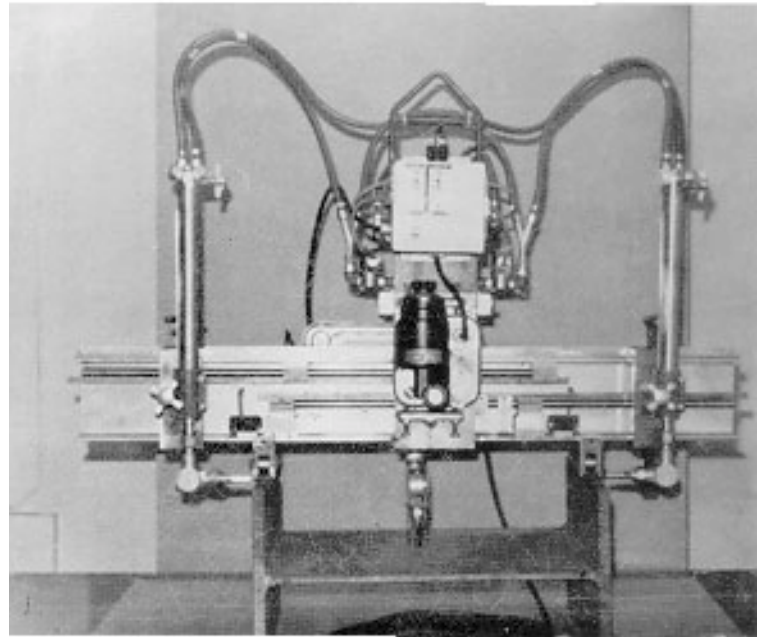
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**Application:** Mechanize cutting of both flanges and web of heavy beam sections simultaneously.

**Process:** Oxyfuel gas cutting.

**Equipment:** Customer designed machine made from BUG-O Drive Unit, Rail, Limit Switches, Racks, Rack Riders and Torchholders.

**Savings:** Production increased eight to ten-fold due to reduced layout time, cutting time and elimination of grinding.



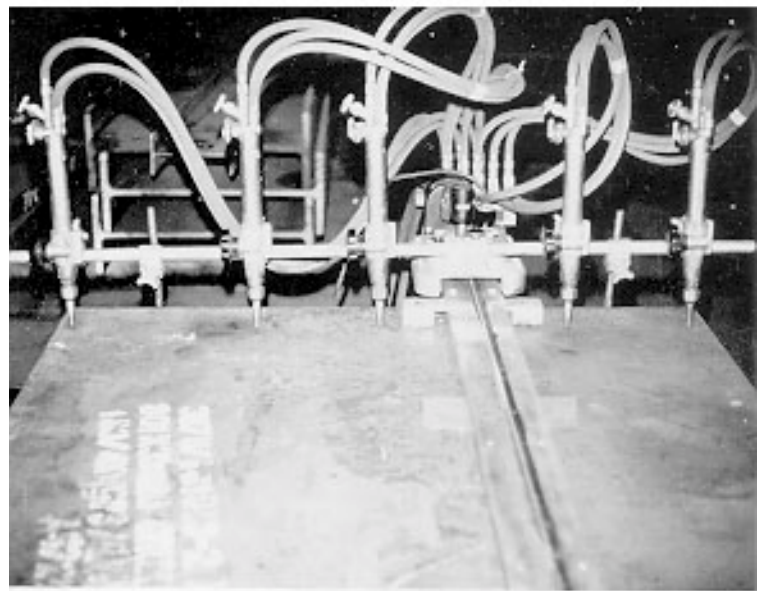
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**Application:** Stripping 1-3/4" (45 mm) and 2-3/4" (70 mm) plate to fabricate box columns — 4 pieces per plate.

**Process:** Oxyfuel gas cutting.

**Equipment:** BUG-O DC III Rail, 53" (1346 mm) Aluminum Bar, Torchholders with clamps, two panograph wheels.

**Savings:** Strips distortion-free, minimal cleanup before assembly.







# Applications

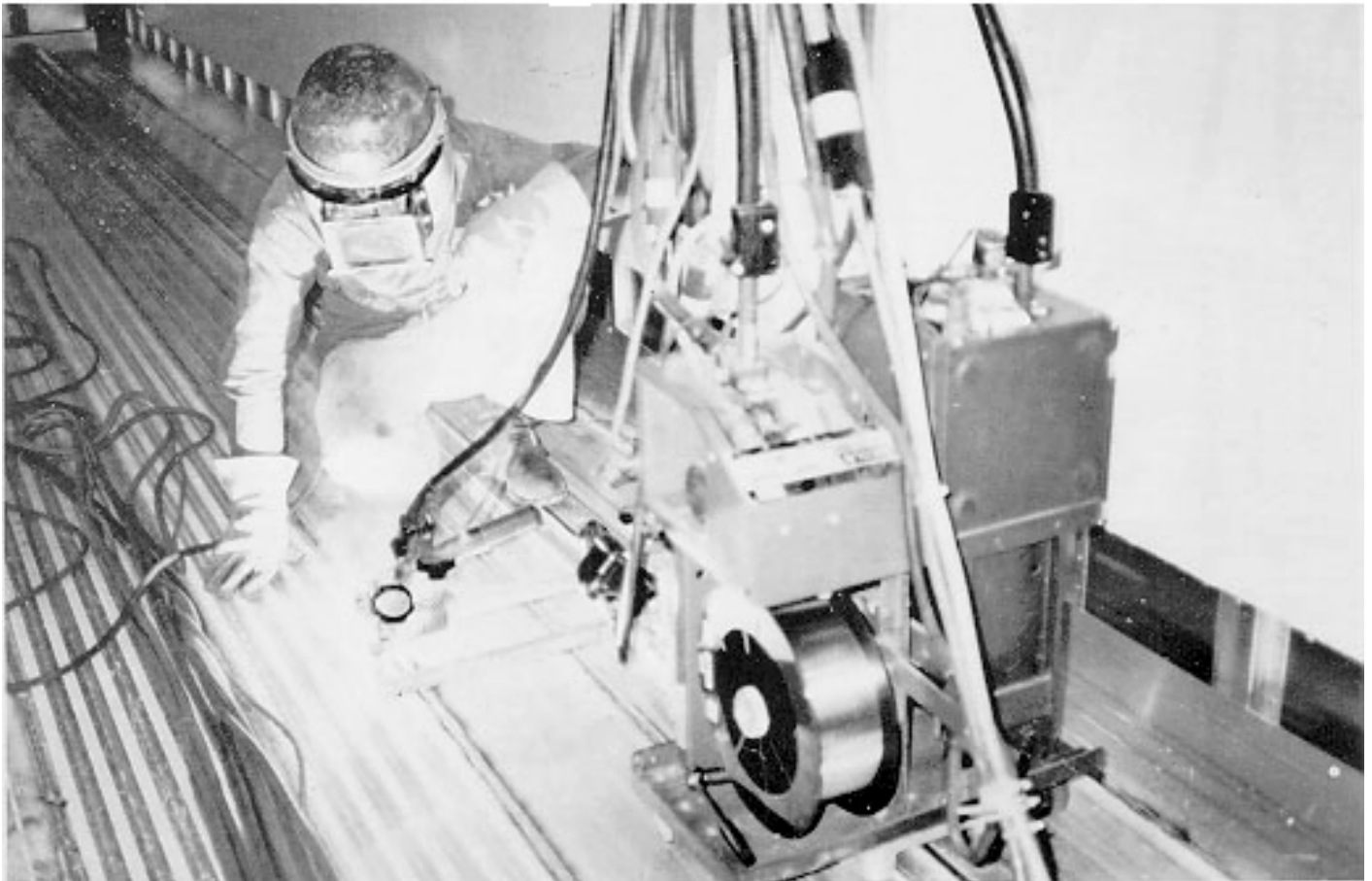
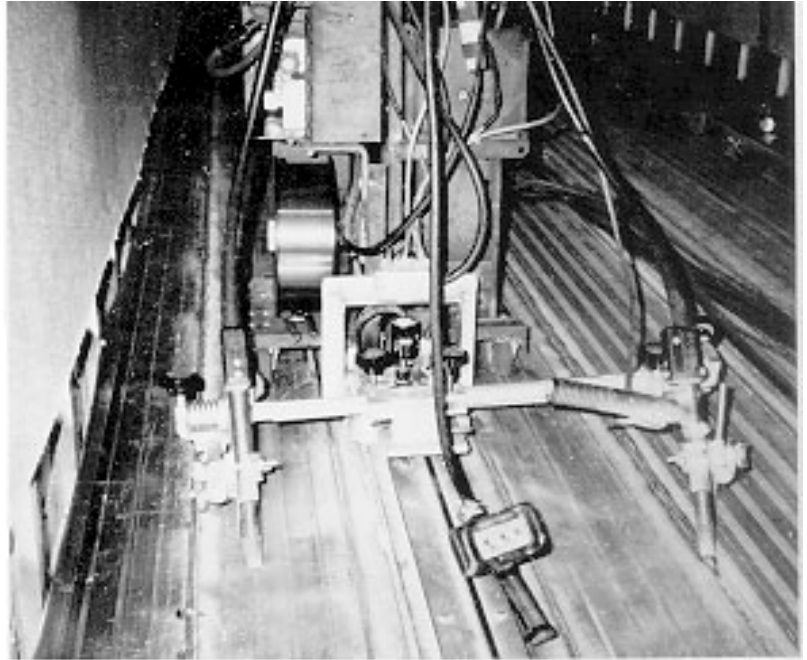
## GMAW / MIG / TIG / FCAW Welding

**Application:** Continuous welds on aluminum truck trailer bodies 45 ft. (15 m) long.

**Process:** MIG welding.

**Equipment:** BUG-O General Welding Kit with accessories supplied by customer.

**Savings:** 300% over manual welding.

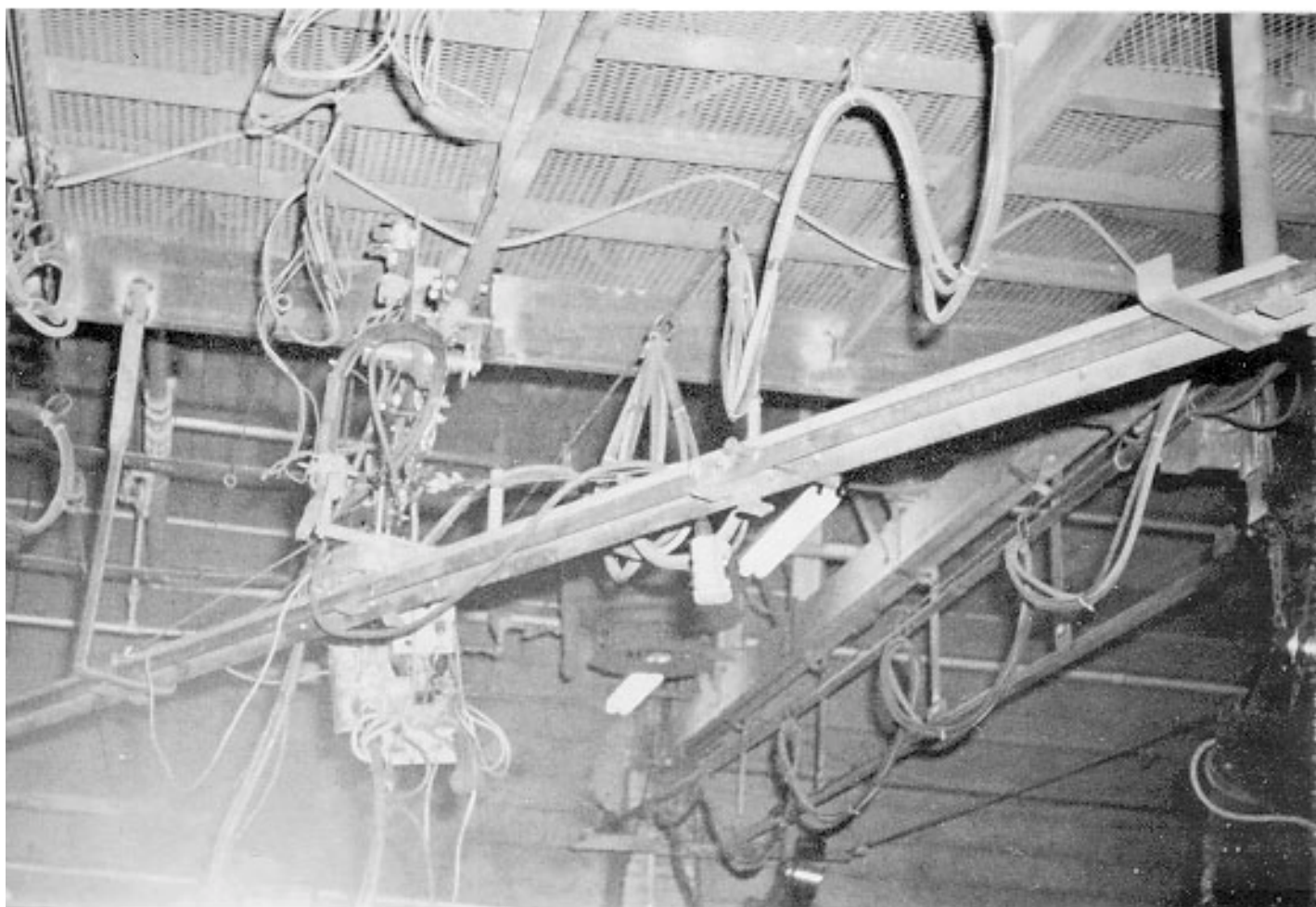
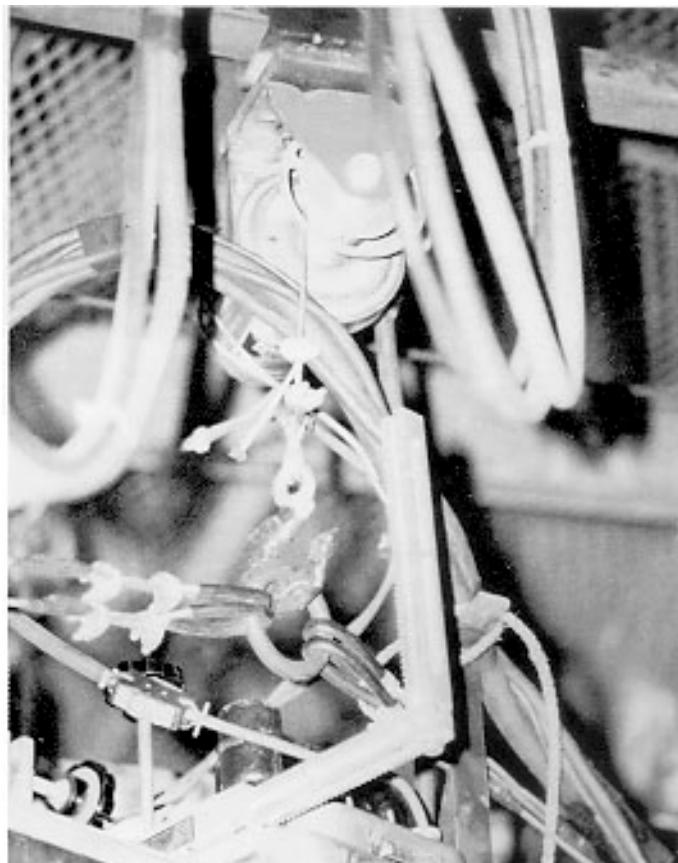


**Application:** Fabricating steel dump truck bodies.

**Process:** Flux Cored arc welding.

**Equipment:** BUG-O General Welding Kit with extra lengths of rail on customer's fixture.

**Savings:** Increased speed and deposition rates, reduced welding time 700%.



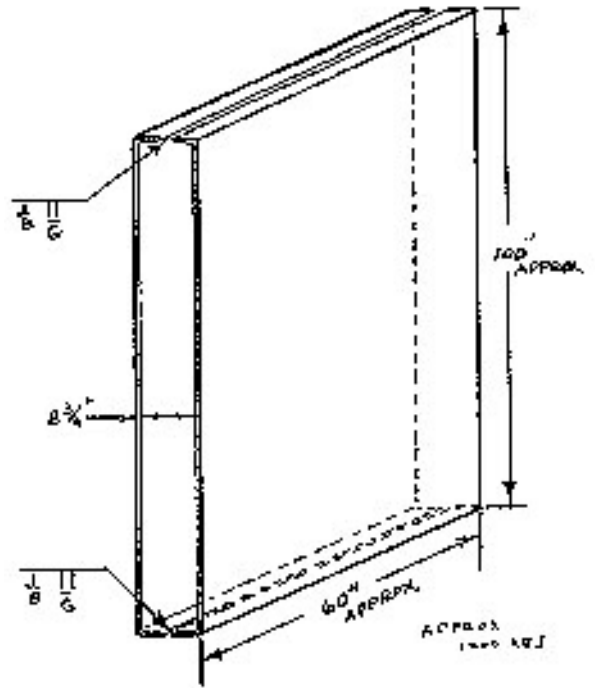
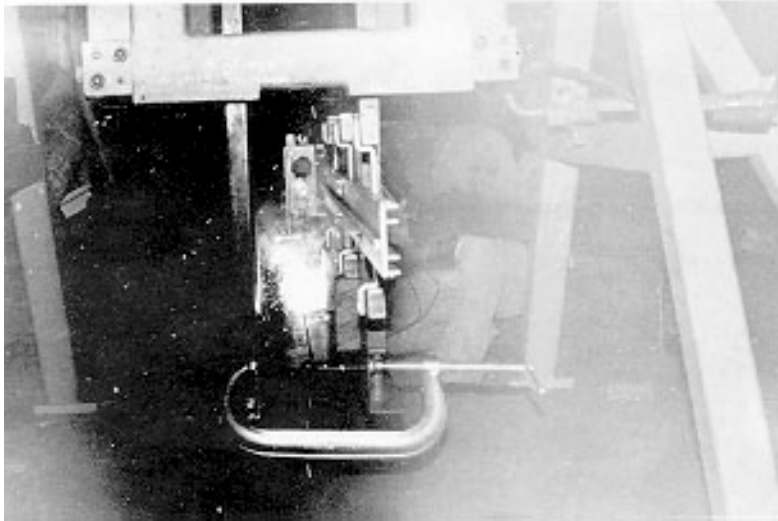


**Application:** Weld inside narrow box section.

**Process:** MIG welding.

**Equipment:** SKUTER with pendant control, torch mounts, low profile magnets and ARR-rails.

**Savings:** 4-1/2 hours per weldment.

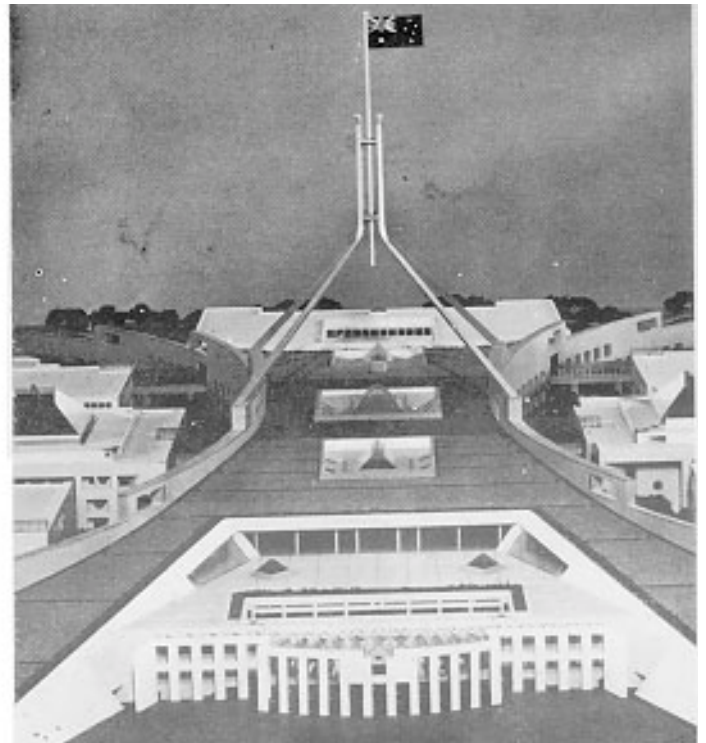


**Application:** Weld inside triangular stainless steel section to make legs for flagmast.

**Process:** MIG welding.

**Equipment:** BUG-O General Welding Kit.

**Savings:** Mechanization increased speed and accuracy of welding and reduced distortion to a minimum.



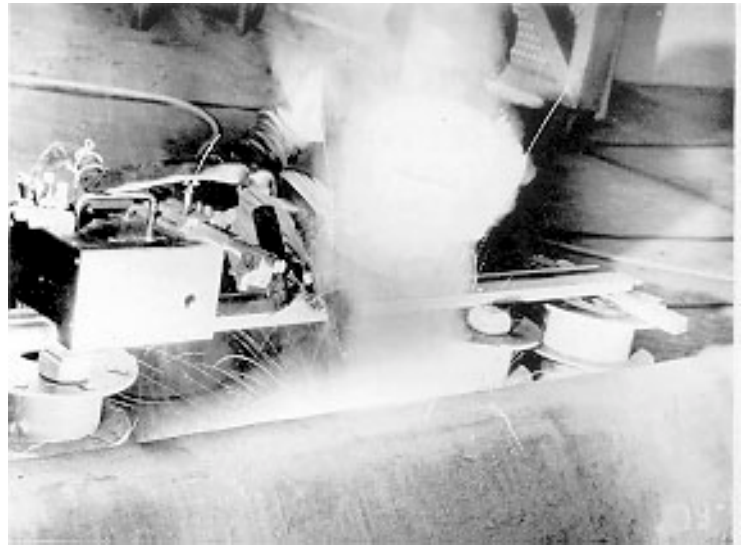


**Application:** Hardfacing beams for dolomite crusher preheated to 212° F. (100° C.)

**Process:** Flux cored arc welding.

**Equipment:** GO-FER II with rail and magnets.

**Savings:** 35 hours per beam over manual welding.



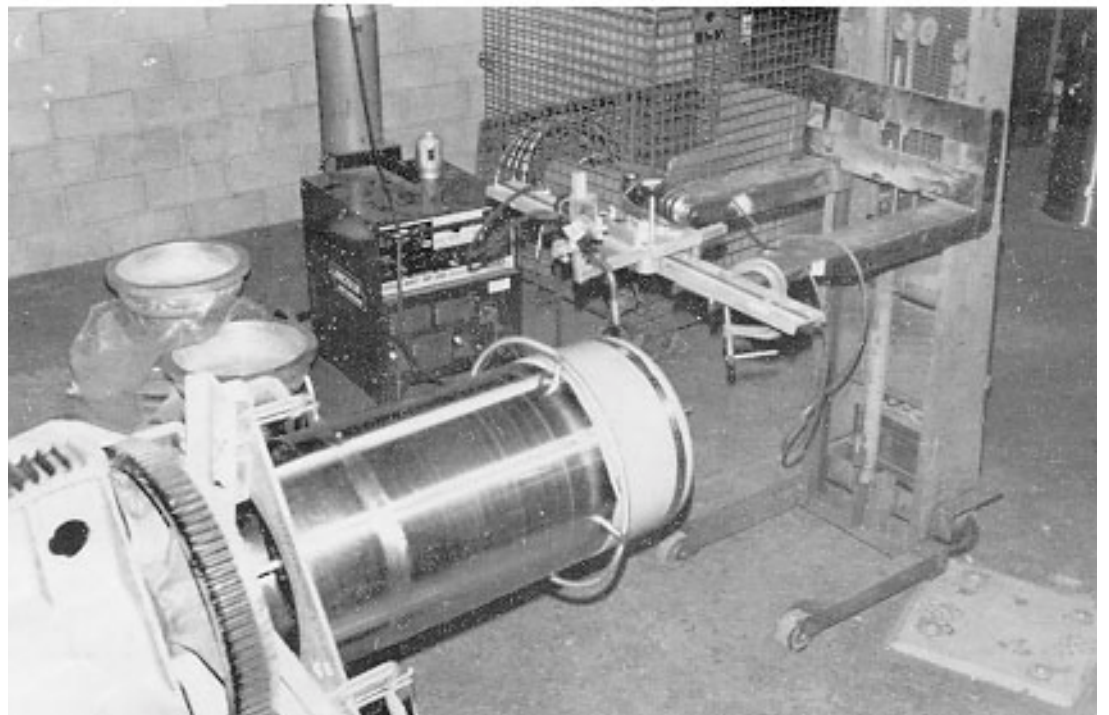
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**Application:** Building 30 gallon (113 liter) vessels to ASME code.

**Process:** MIG welding.

**Equipment:** BUG-O General Welding Kit.

**Savings:** High quality job produced ahead of schedule with minimum distortion and zero defects.

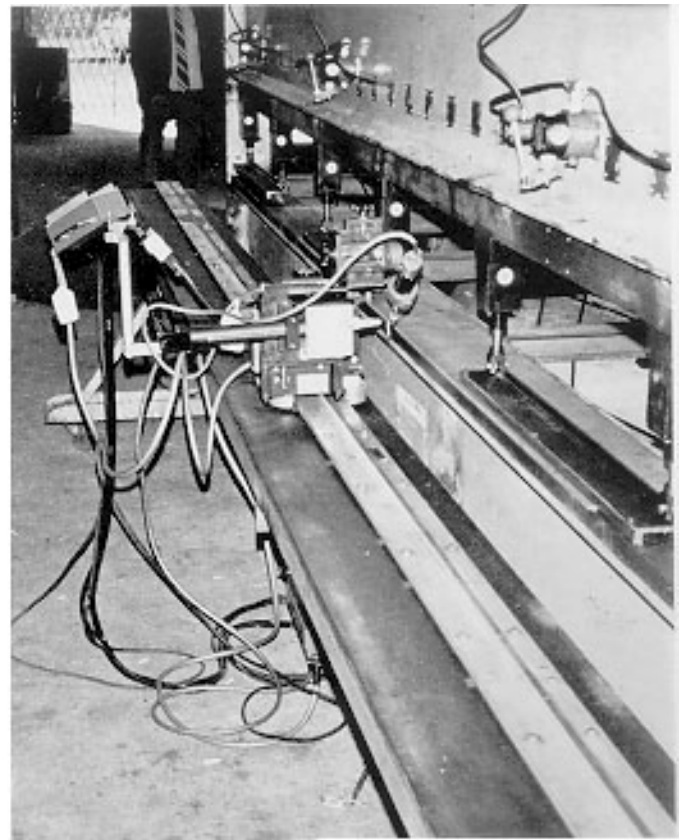
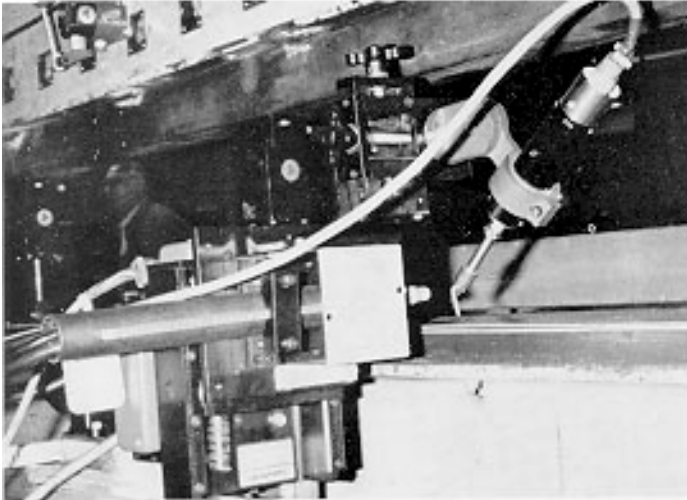


**Application:** Fabrication of stainless steel condenser panels.

**Process:** MIG welding.

**Equipment:** BUG-O DC IV with seam tracker mounted on customer's fixture.

**Savings:** Welding speed increased 400% without defects.



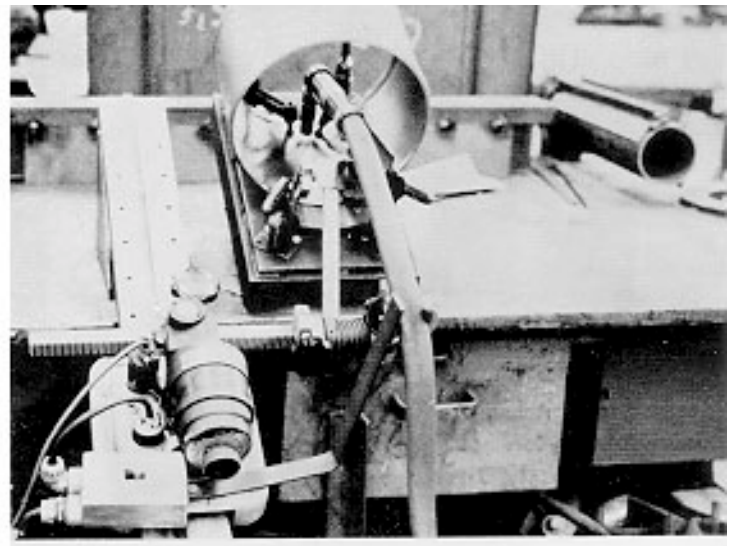
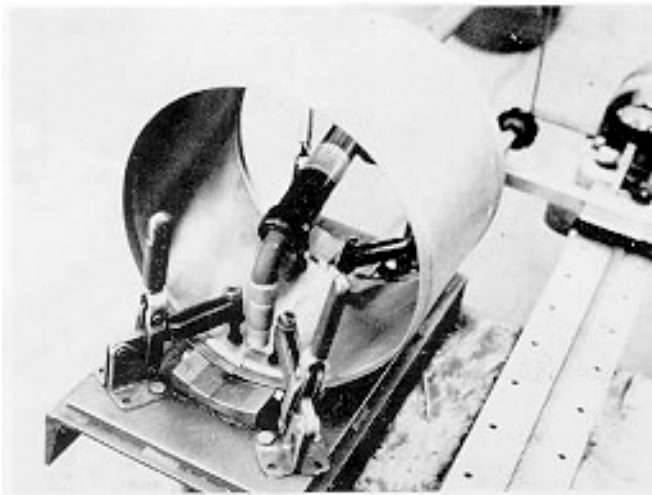
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**Application:** Welding 12" (304 mm) diameter bag collars for dust collection equipment.

**Process:** MIG welding.

**Equipment:** BUG-O General Welding Kit.

**Savings:** 100% penetration, 3 times faster than manual welding, excellent quality.



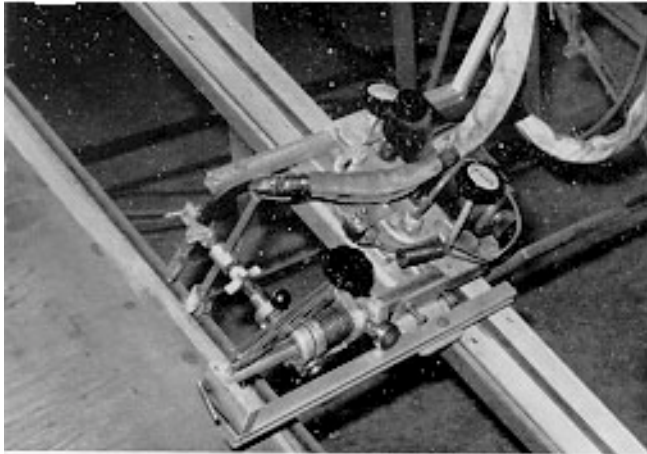
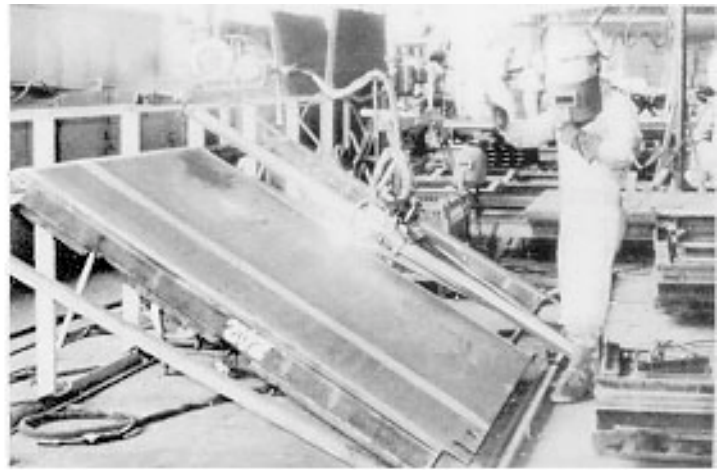


**Application:** Welding sides of railway cars.

**Process:** MIG welding.

**Equipment:** BUG-O General Welding Kit.

**Savings:** Uniform bead appearance and size, minimum distortion, little grinding and increase in production.

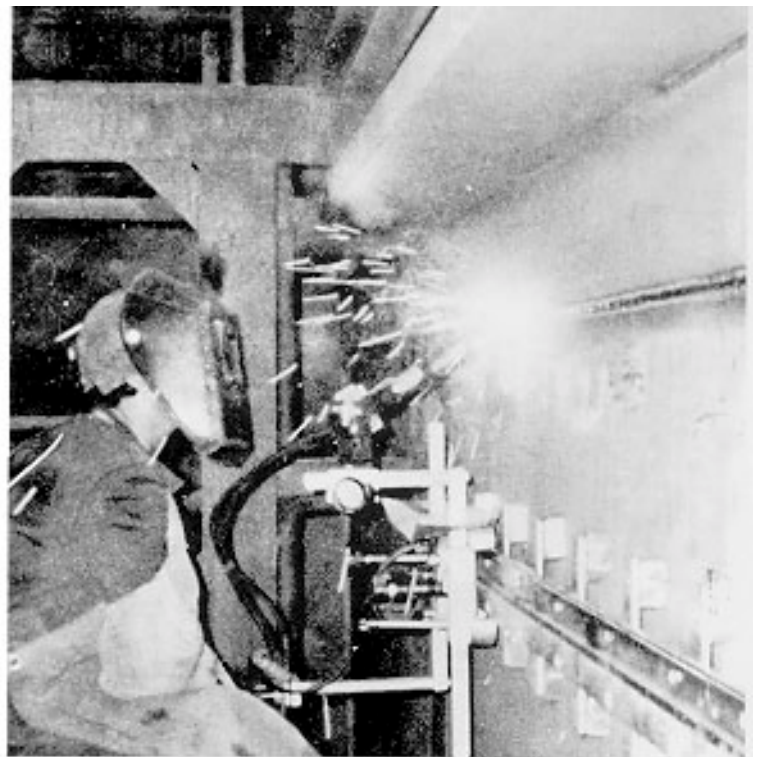
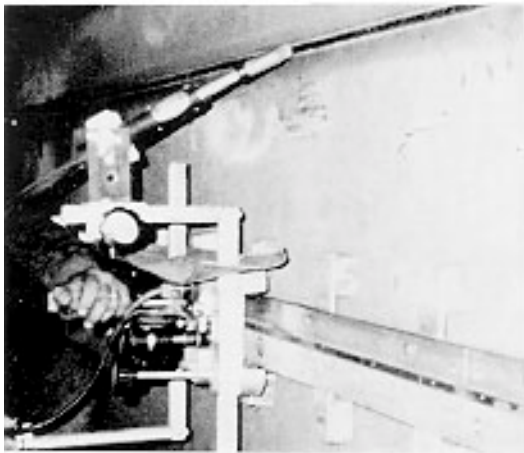


**Application:** Overhead welding on bridge crane girder to increase capacity.

**Process:** MIG welding.

**Equipment:** BUG-O General Welding Kit.

**Savings:** Fast, consistent welds with minimum distortion and without operator fatigue.



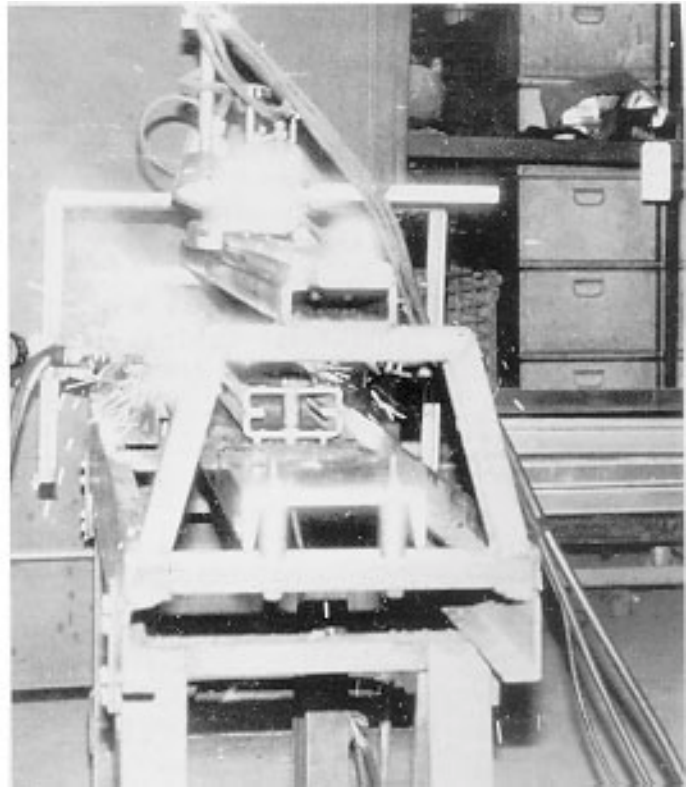
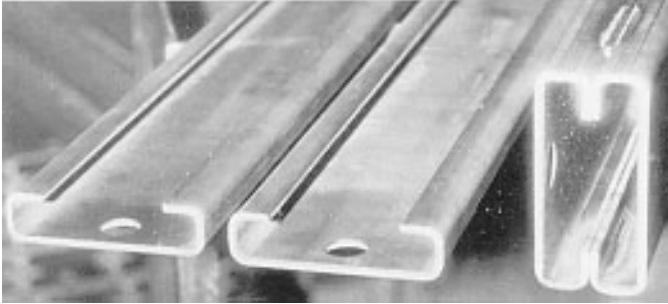


**Application:** Intermittent (skip) welding on box sections.

**Process:** Flux cored arc welding.

**Equipment:** BUG-O Skip Welder, rail, double torch mounting group and cable anchor mounted on customer's fixture.

**Savings:** 150 man hours per month (investment recovered in 2 months).



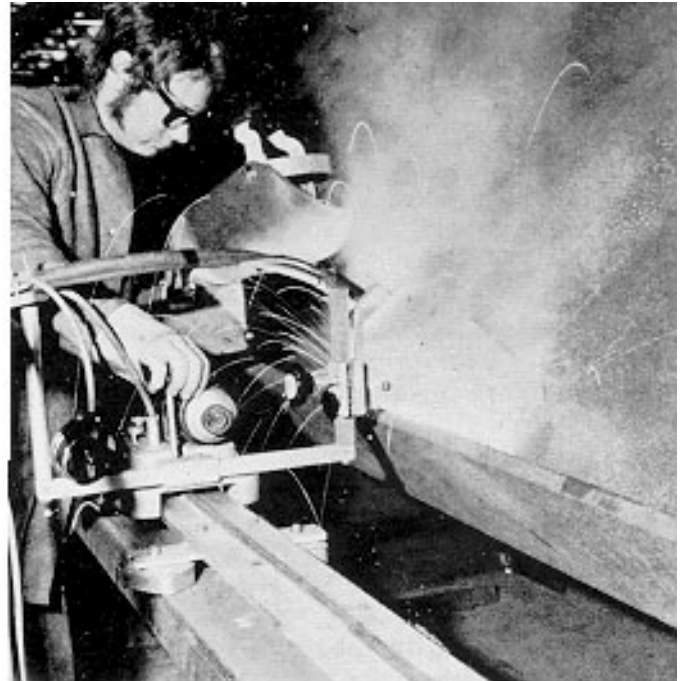
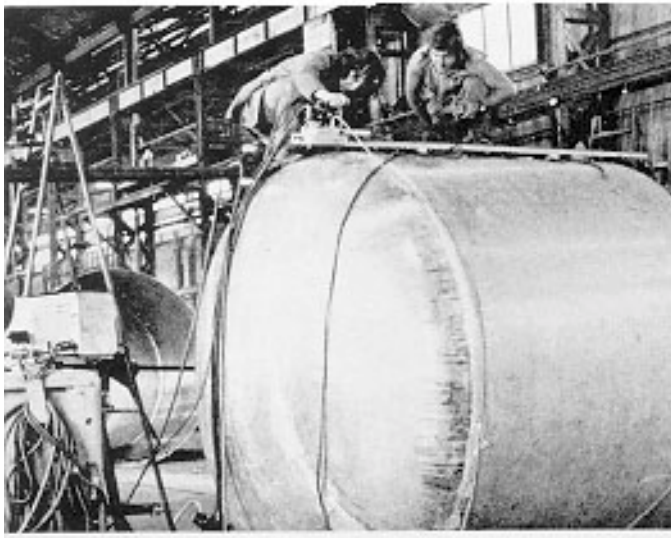
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**Application:** Fabrication of aluminum railway tank cars.

**Process:** MIG welding.

**Equipment:** BUG-O General Welding Kit.

**Savings:** 300% increase in production.

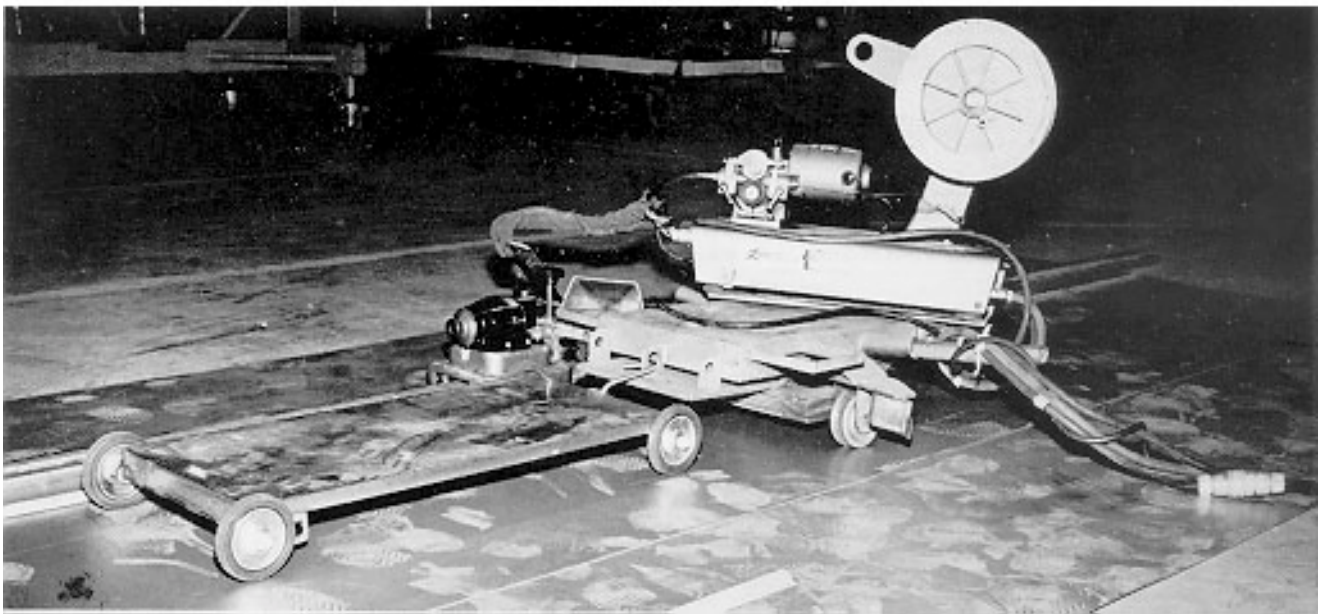


**Application:** Welding cooling coils on stainless steel tanks.

**Process:** MIG welding.

**Equipment:** BUG-O Heavy Duty Welding Kit plus customer's wire feeder and operator.

**Savings:** Improved quality with substantial savings — welded 40 ft. (12 m) in 20 minutes.

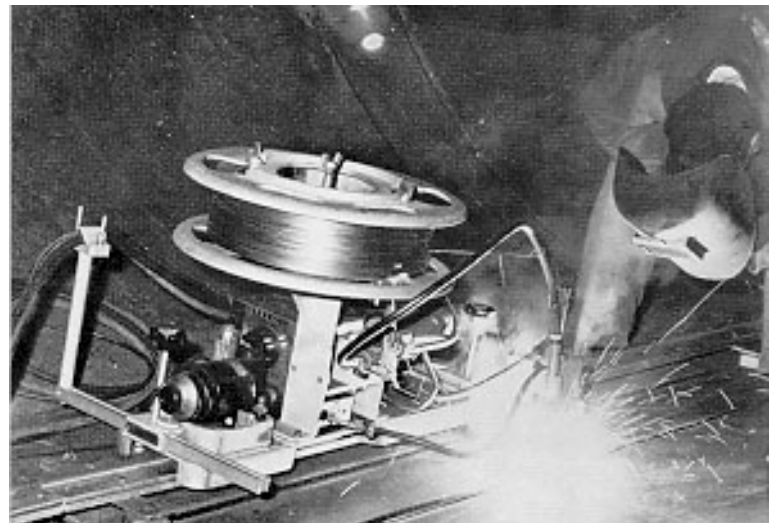


**Application:** Fabricating double shelled cylinders for ore reclaimer modules.

**Process:** Flux cored GMA.

**Equipment:** BUG-O Heavy Duty Welding Kit, wire feeder mounted by customer.

**Savings:** Substantially increased production.



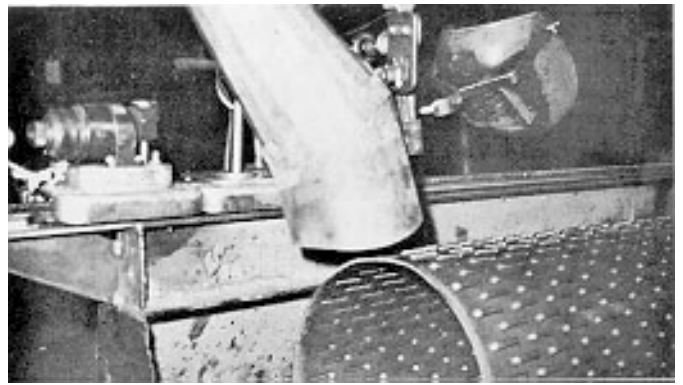


**Application:** Making long seam welds on well screen.

**Process:** MIG welding.

**Equipment:** BUG-O Heavy Duty Welding Kit.

**Savings:** Unskilled operator welds 800 ft. (244 m) per day, 5 days a week.

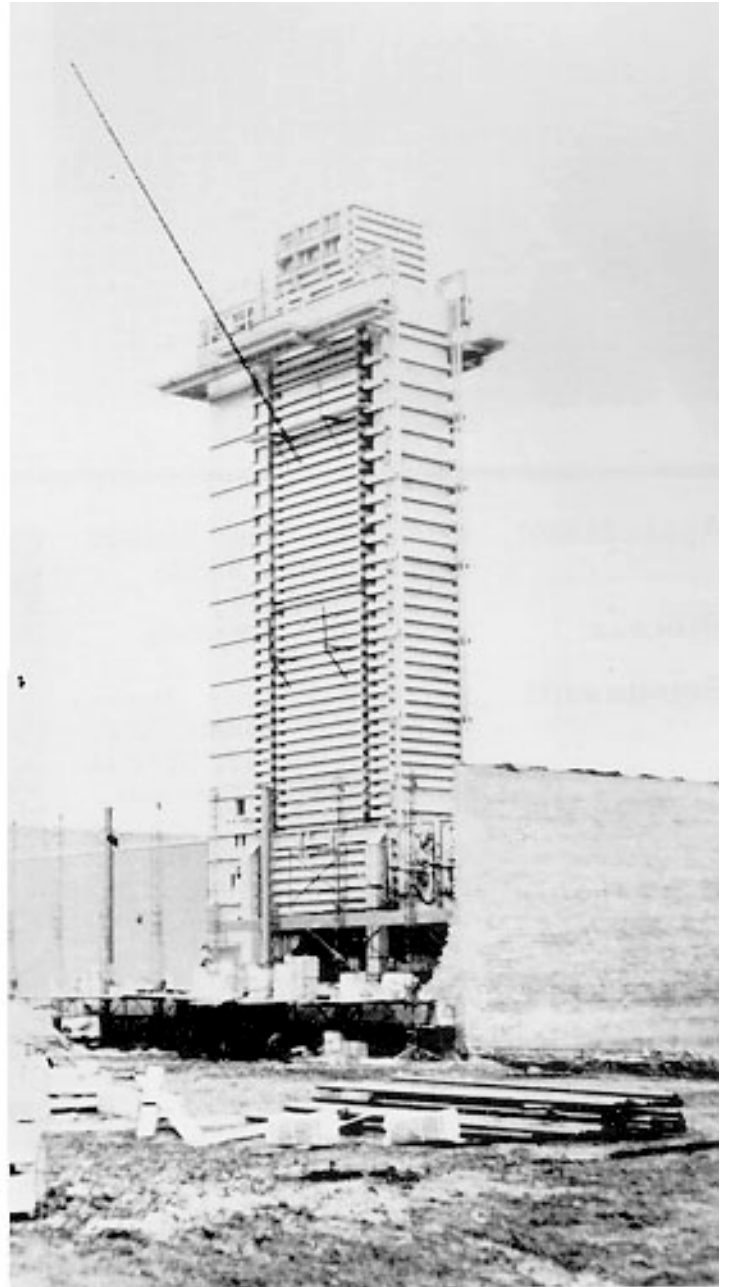


**Application:** Welding "In-Can" sterilizer towers up to 70 ft. (21 m) high.

**Process:** Flux cored arc welding.

**Equipment:** BUG-O General Welding Kit.

**Savings:** Mechanization increased production 300% with no operator fatigue and no distortion.



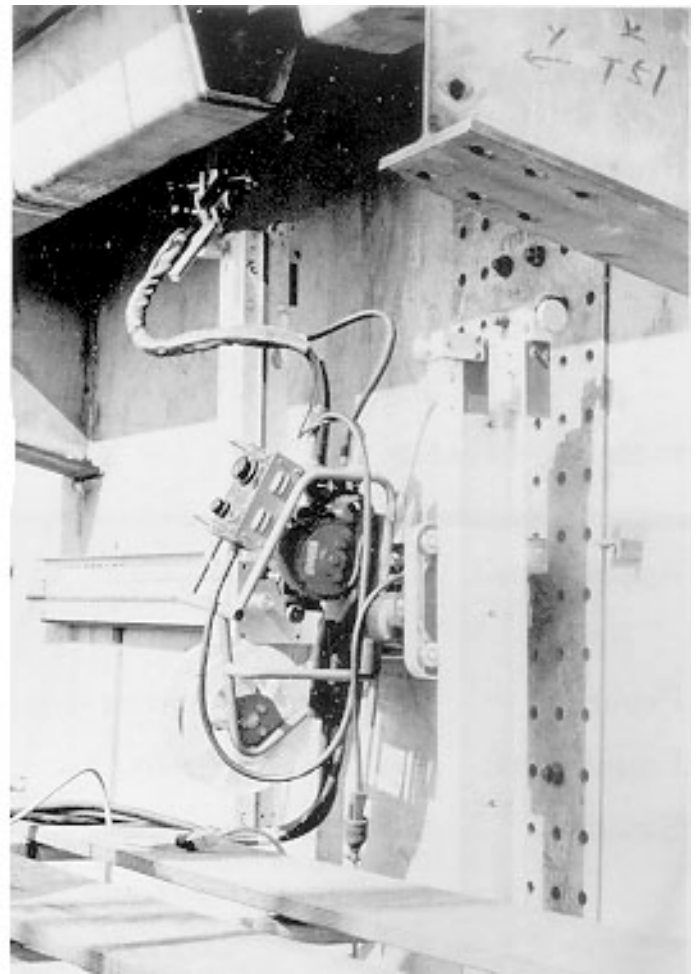


**Application:** Fabrication of large orthotropic bridge girders.

**Process:** MIG welding.

**Equipment:** BUG-O Heavy Duty Welding Kit, two spotting carriages, rails and torchholder, mounted on customer's fixture.

**Savings:** 40% increase in production rate.



**Application:** Welding half-pipe sections onto a pipeline barge.

**Process:** Flux cored arc welding.

**Equipment:** BUG-O Heavy Duty Welding Kit, double torch mounting group, special trailer made by customer.

**Savings:** Production increased 16 times — 180 ft. (27 m) welded in one hour.

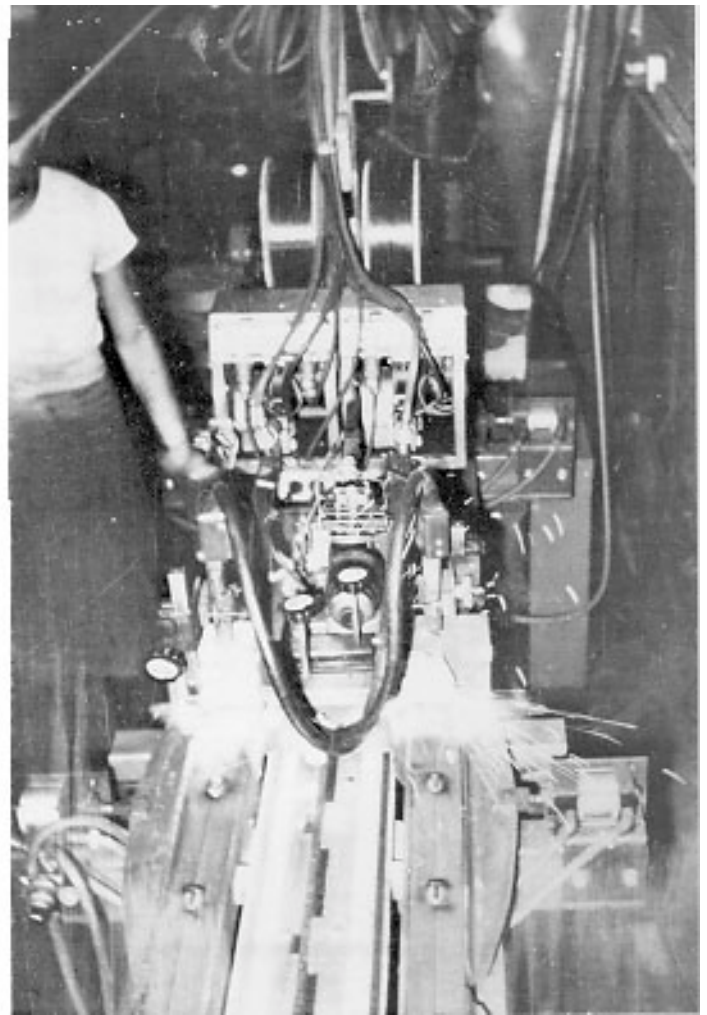
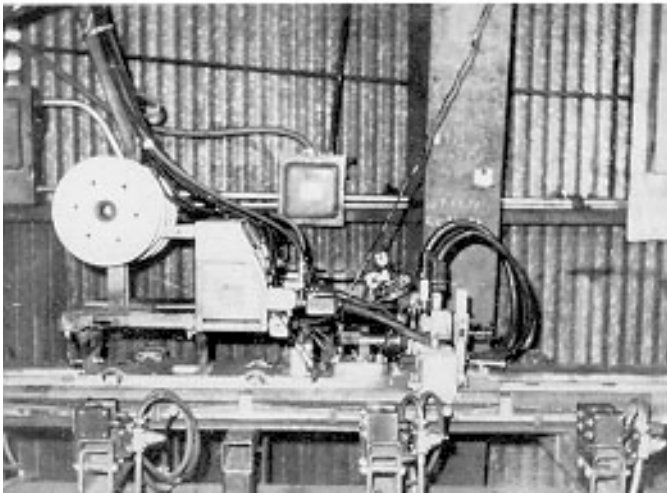


**Application:** Fabrication of center sills for boat trailers.

**Process:** Flux cored arc welding.

**Equipment:** BUG-O Skip Welding Kit and Rail.

**Savings:** Equipment cost \$200,000 less than custom machine and increased production four times over manual welding.



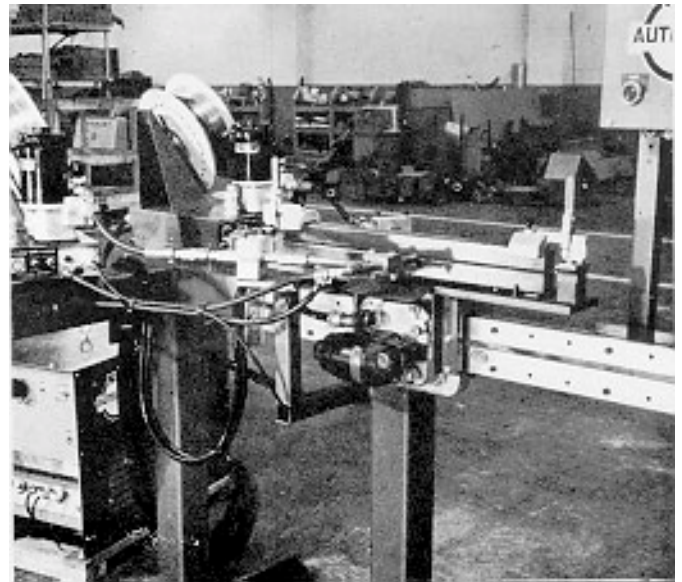
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**Application:** Intermittent (skip) welding of two small box sections — the work is moved past the welding guns.

**Process:** MIG welding.

**Equipment:** BUG-O Skip Welding Kit, fixture made by customer.

**Savings:** Welding speed increased to 42 inches (1.06 m) per minute.

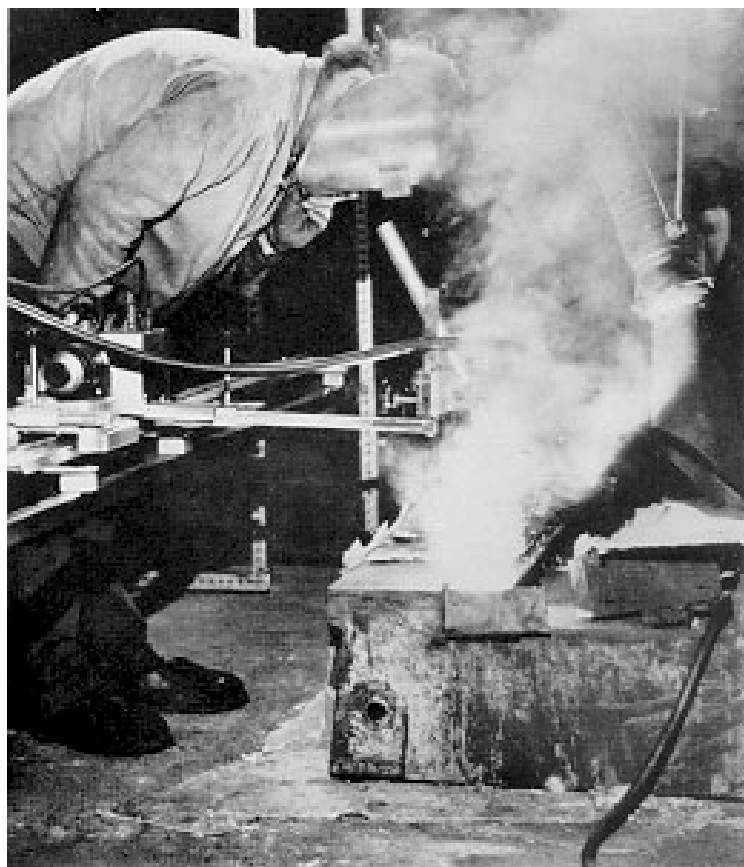


**Application:** Rebuilding sow blocks on forging hammers (high preheat).

**Process:** MIG welding.

**Equipment:** BUG-O Speed Weaving Kit mounted on customer's fixture.

**Savings:** 17.3 man hours saved on each sow block.



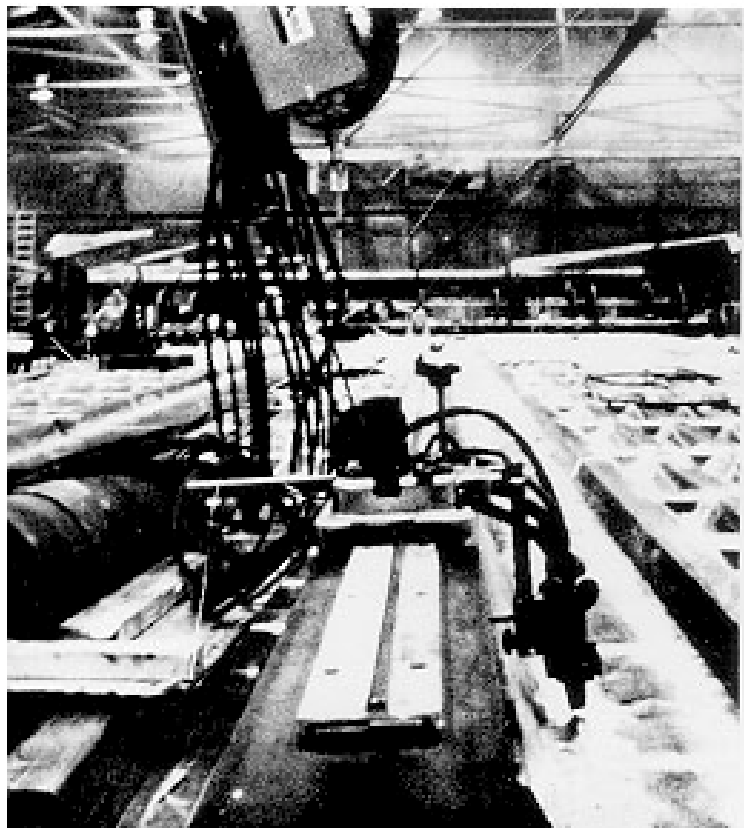
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**Application:** Welding of corrugated aluminum panels for ship construction.

**Process:** MIG welding.

**Equipment:** BUG-O Heavy Duty Welding Kit.

**Savings:** Mechanization provided 95% x-ray perfect welds with minimum distortion and saved 1500 man hours per year.



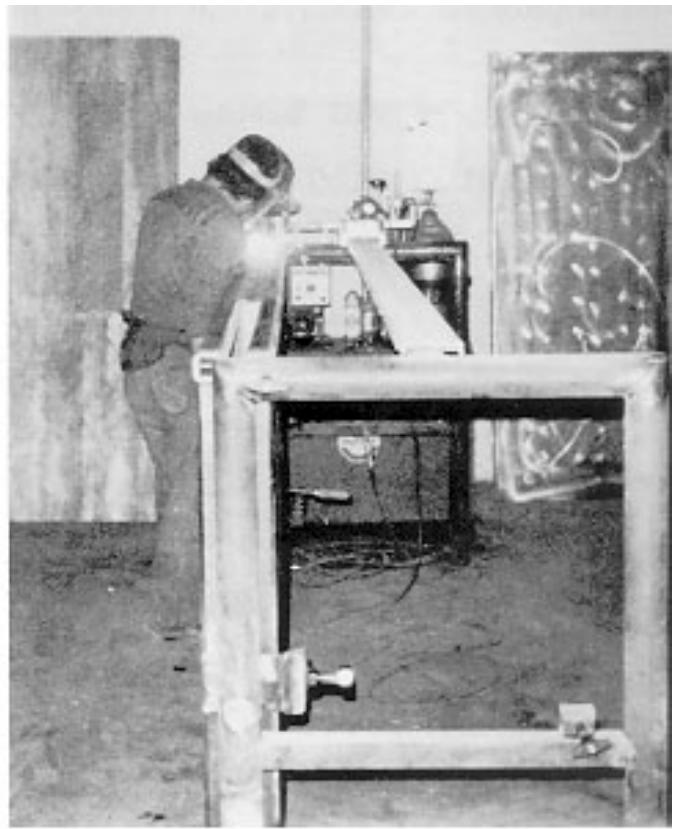
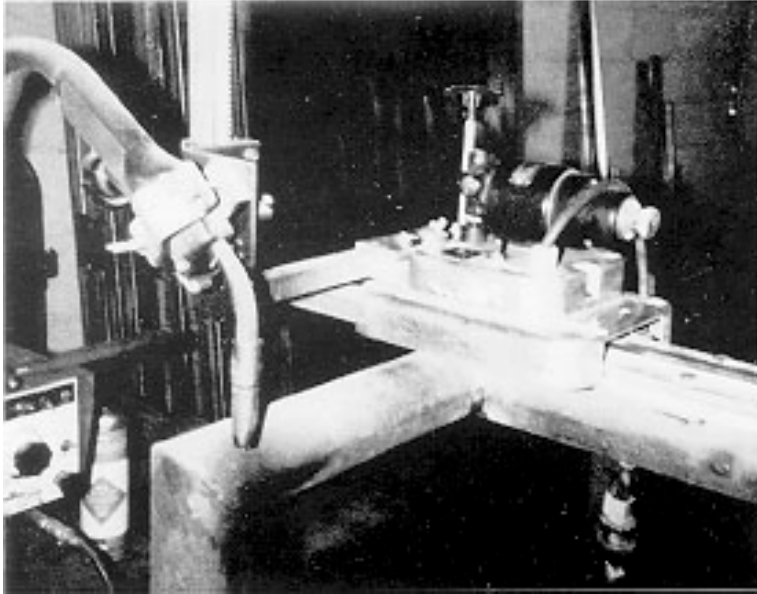


**Application:** Fabrication of hollow metal doors.

**Process:** MIG welding.

**Equipment:** BUG-O General Welding Kit, fixture made by customer.

**Savings:** Mechanization doubled production.



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**Application:** Welding vertical seams on cold boxes for air separation plant.

**Process:** MIG welding.

**Equipment:** BUG-O General Welding Kit.

**Savings:** Reduced welding time 25% and drastically lowered maintenance costs.

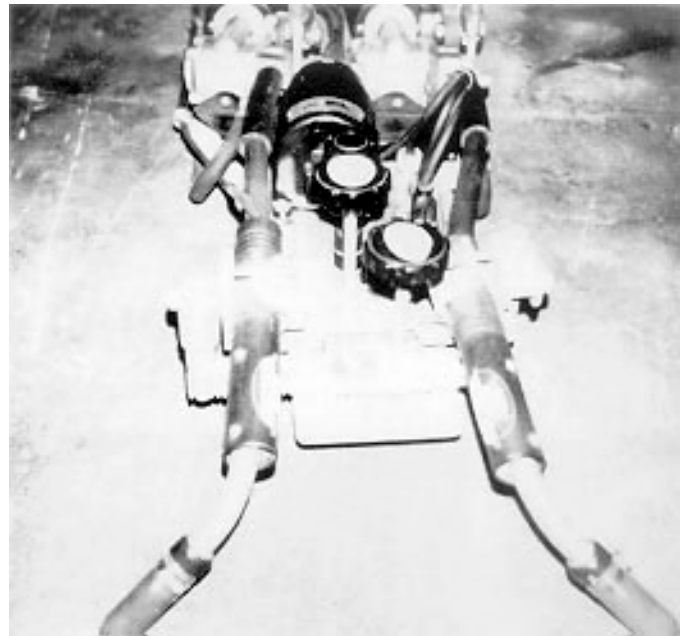
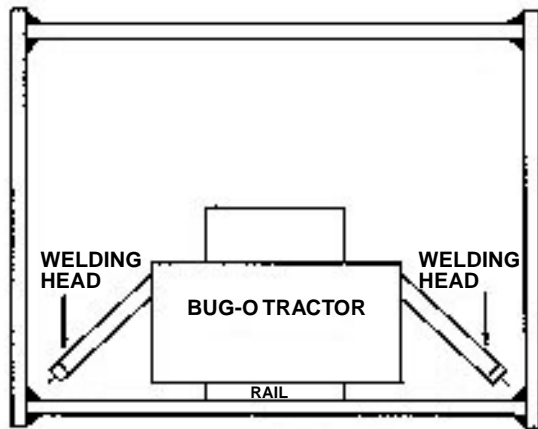


**Application:** Fabricating long box sections for crane girders.

**Process:** MIG welding.

**Equipment:** BUG-O Heavy Duty Welding Kit, Double Torch Mounting Group.

**Savings:** High speed with minimum distortion exceeded ultrasonic testing requirements.

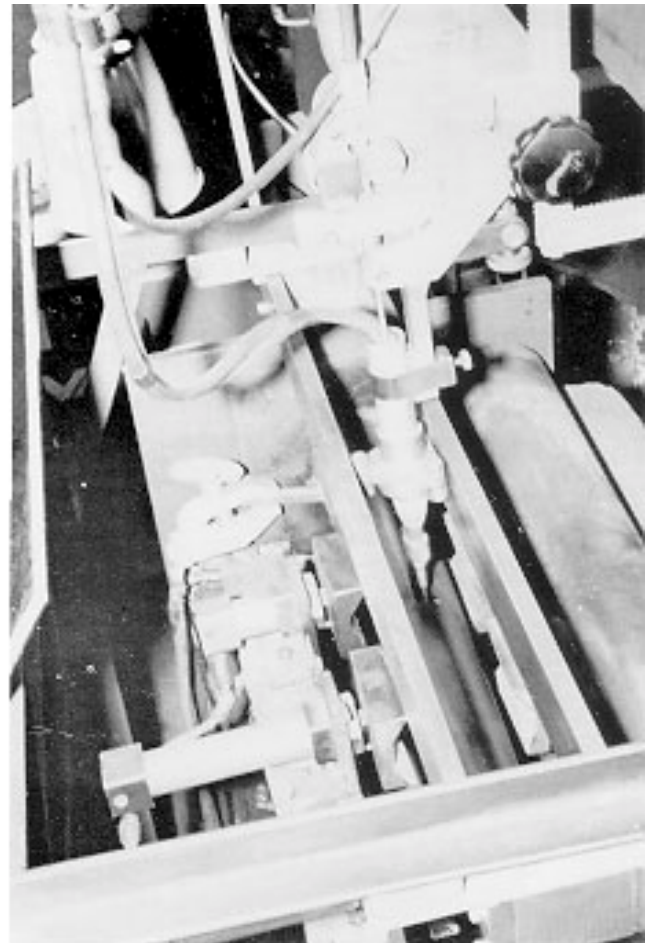


**Application:** Manufacturing motorcycle mufflers from 20 gauge (.9 mm) mild steel.

**Process:** MIG welding.

**Equipment:** BUG-O Skip Welder and Rail mounted on customer's fixture.

**Savings:** 75% reduction in welding time and distortion free product.

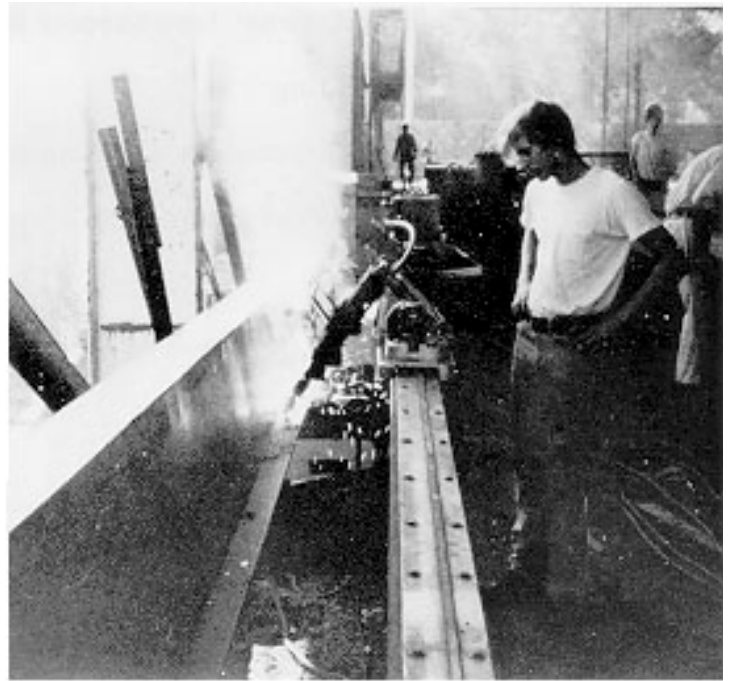


**Application:** Mechanizing the welding of 48 ft. (15 m) columns.

**Process:** Flux cored arc welding.

**Equipment:** BUG-O DC V Drive on MUG-O Carriage with Rail and Torchholder mounted on customer's fixture.

**Savings:** Increased production and reduced distortion.



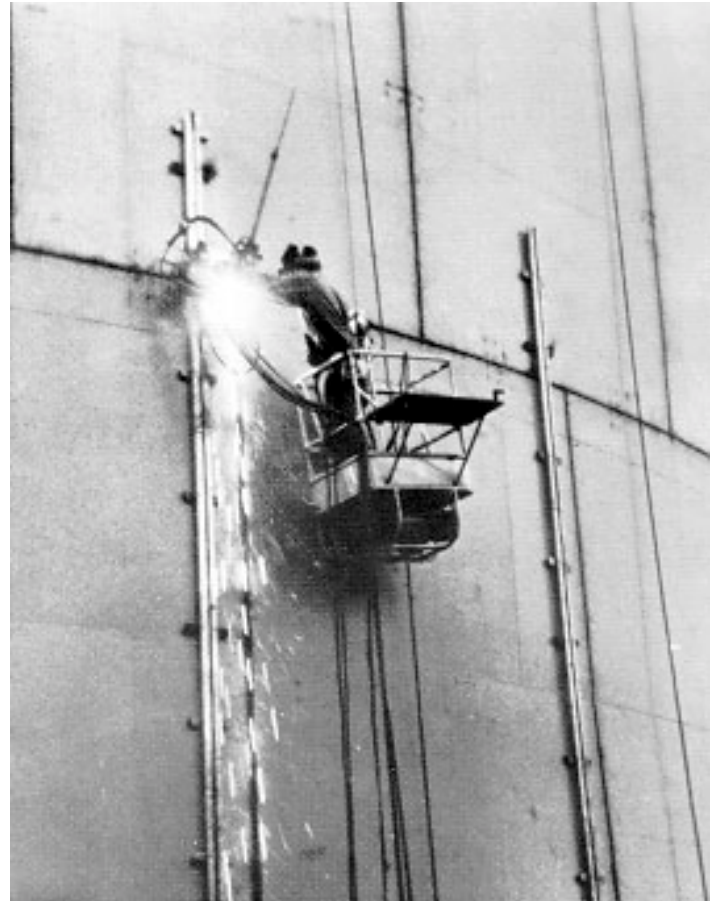
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**Application:** Dismantle, move and re-erect large water storage tank.

**Process:** Oxyfuel; arc gouging and SMAW welding.

**Equipment:** BUG-O Arcair Mounting Kit, Arcair N-600 Arc Gouging Head, Bug-O Torchholder and Fits-All Clamps on All Position Clamp, Rail and Magnets.

**Savings:** Precise flame cutting and arc gouging, reduced welding costs.



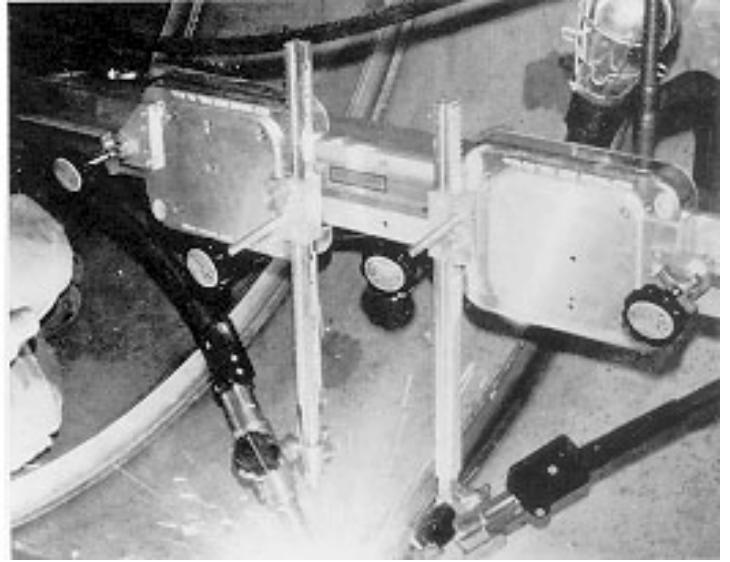


**Application:** Welding internal tray support rings to stainless vessels.

**Process:** MIG welding.

**Equipment:** MUG-O components and standard torch mounts on customer's fixture.

**Savings:** Increased production 400%.



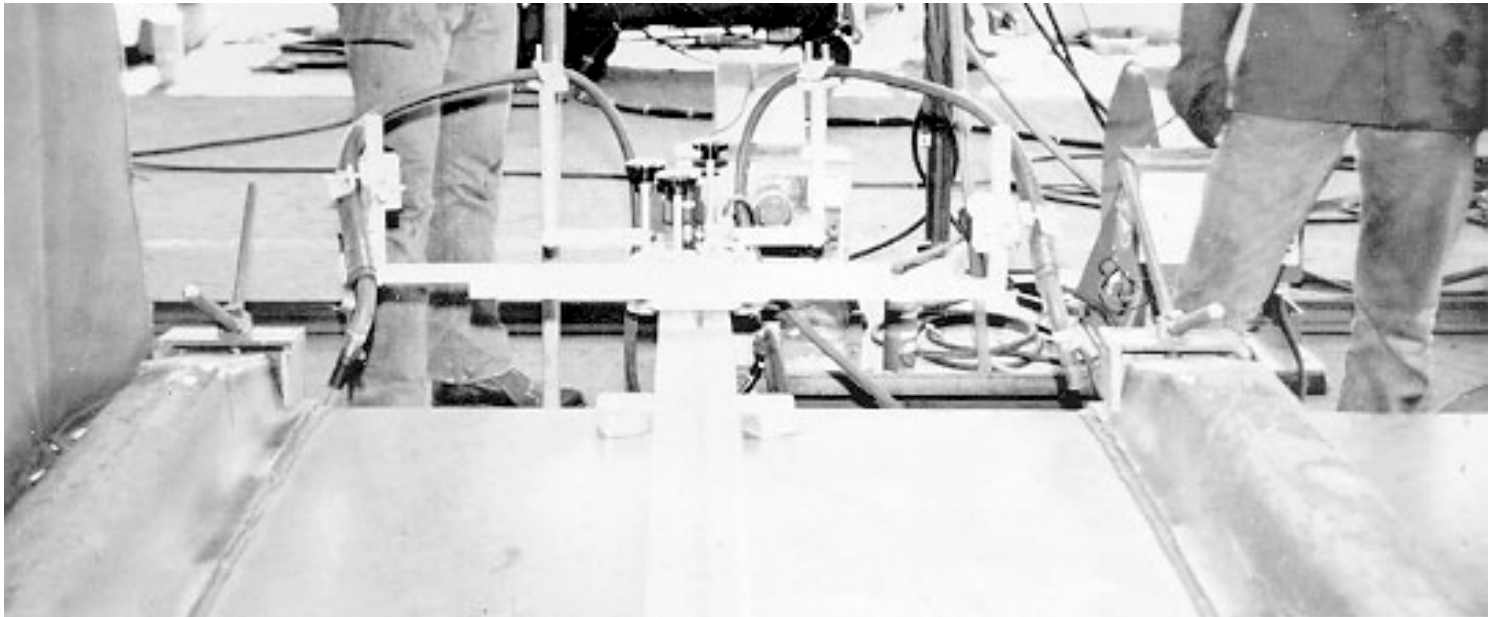
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**Application:** Rebuilding railway cars.

**Process:** MIG welding.

**Equipment:** Bug-O DC IV, Double Torch Welding Group, Rail and Magnets.

**Savings:** Production rate doubled.

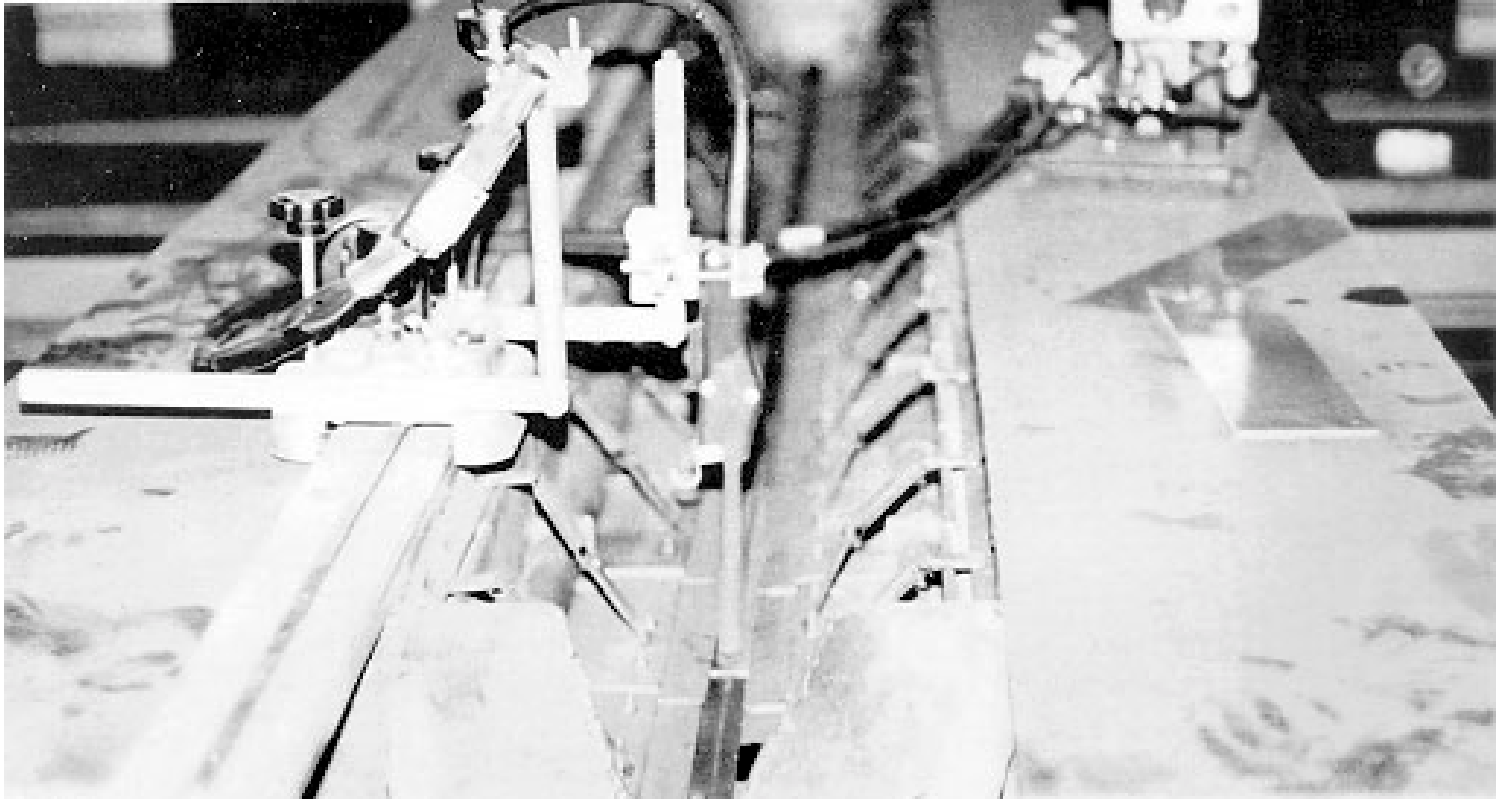


**Application:** Splicing stainless steel plates.

**Process:** MIG welding.

**Equipment:** Bug-O DC Heavy Duty Welding Kit mounted on customer's fixture.

**Savings:** Full penetration welding without distortion, cleaning and grinding eliminated.



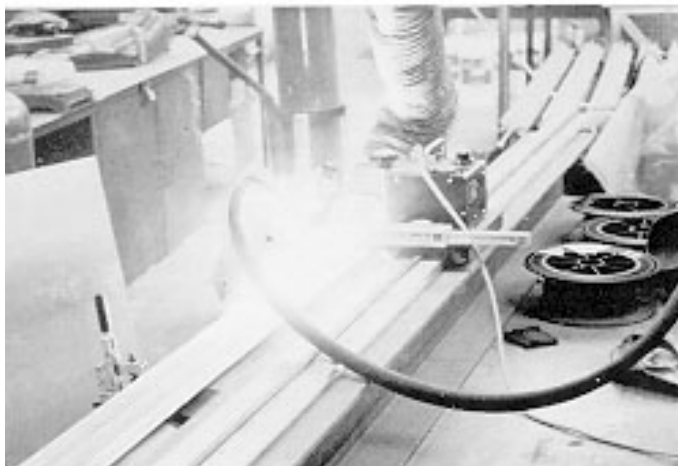
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**Application:** Shrinking aluminum tubing onto stainless pipe.

**Process:** MIG welding.

**Equipment:** Bug-O DC General Welding Kit.

**Savings:** Perfect welds, achieved desired results in minimum time.

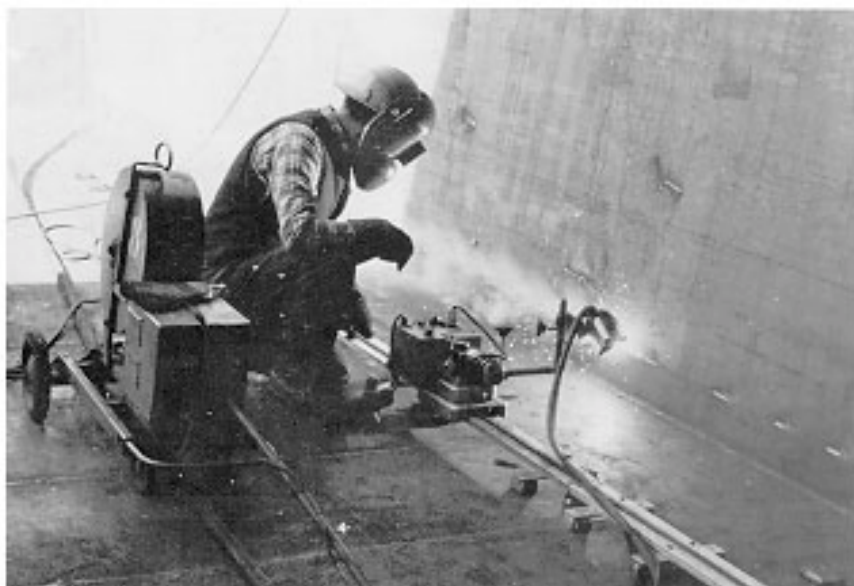
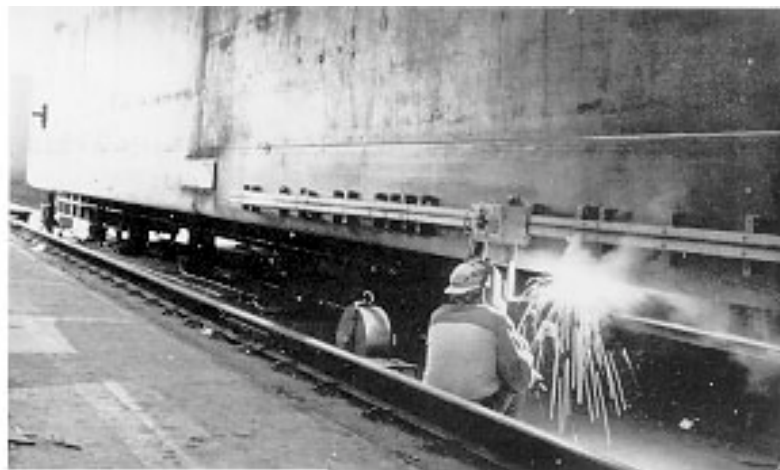


**Application:** Building jumbo coal barges.

**Process:** Flux cored arc welding.

**Equipment:** BUG-O-MATIC.

**Savings:** Production increased 60%, operator fatigue reduced.



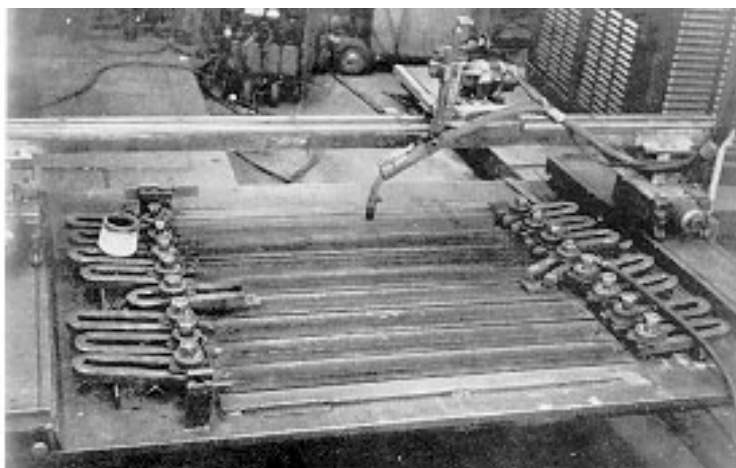
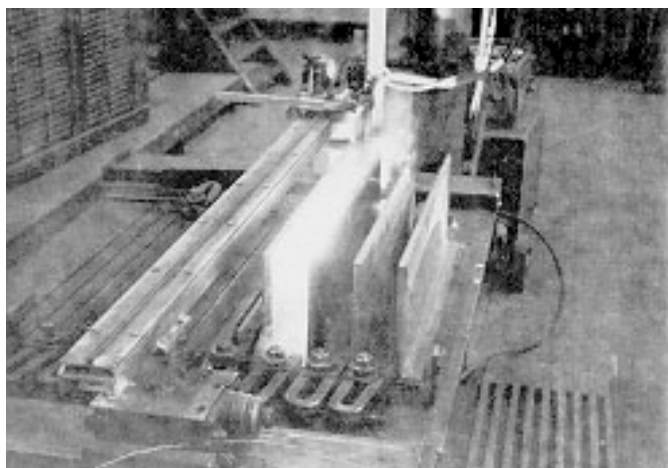
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**Application:** Welding formed cooler blanks for refrigeration equipment.

**Process:** MIG welding.

**Equipment:** Bug-O DC General Welding Kit mounted on customer's fixture.

**Savings:** \$50,000.00 per year.



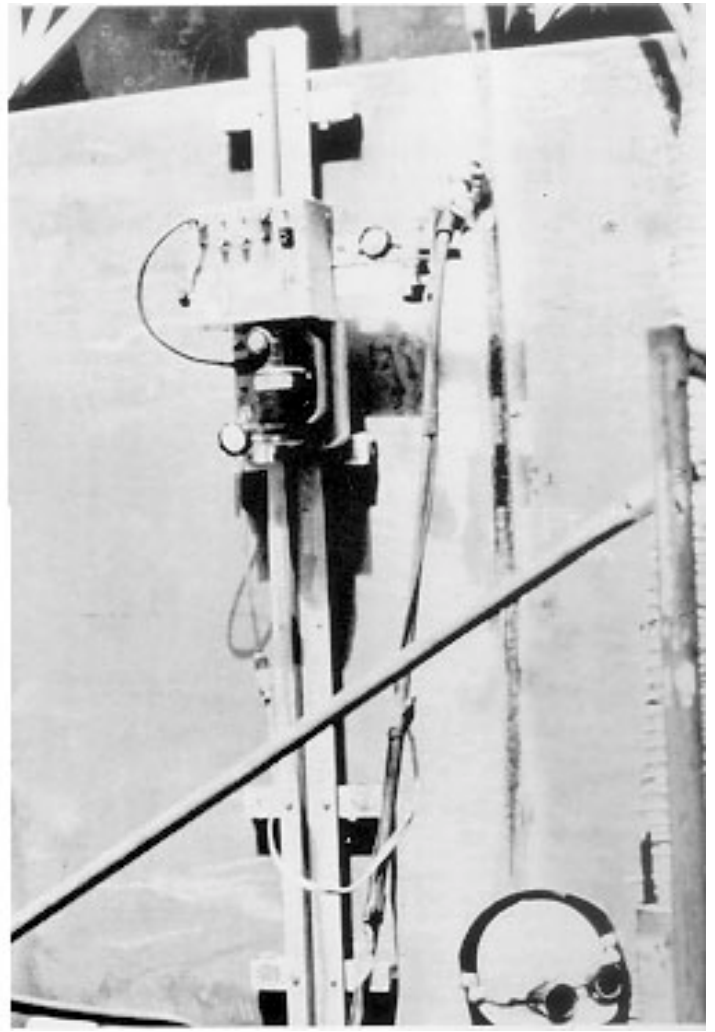
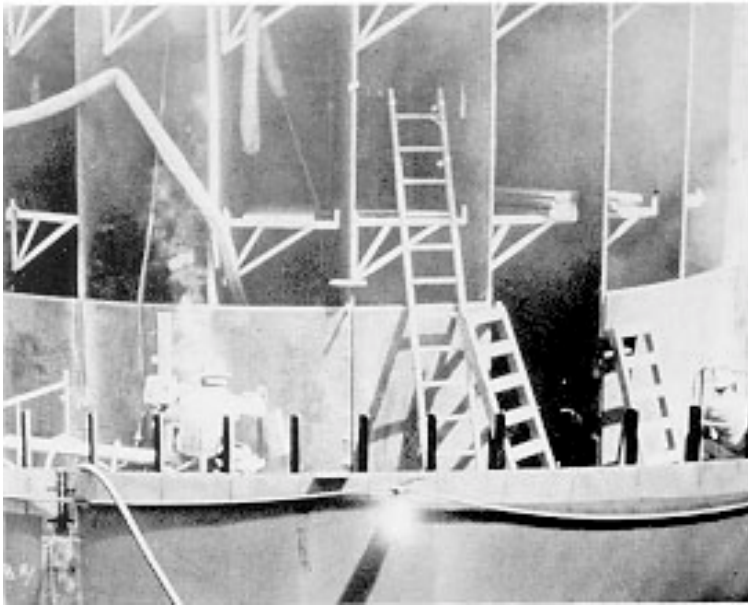


**Application:** Fabrication of nuclear reactor containment vessel.

**Process:** Flux cored arc welding.

**Equipment:** BUG-O Speed Weaving Kit.

**Savings:** Welding completed in 1/3 estimated time.



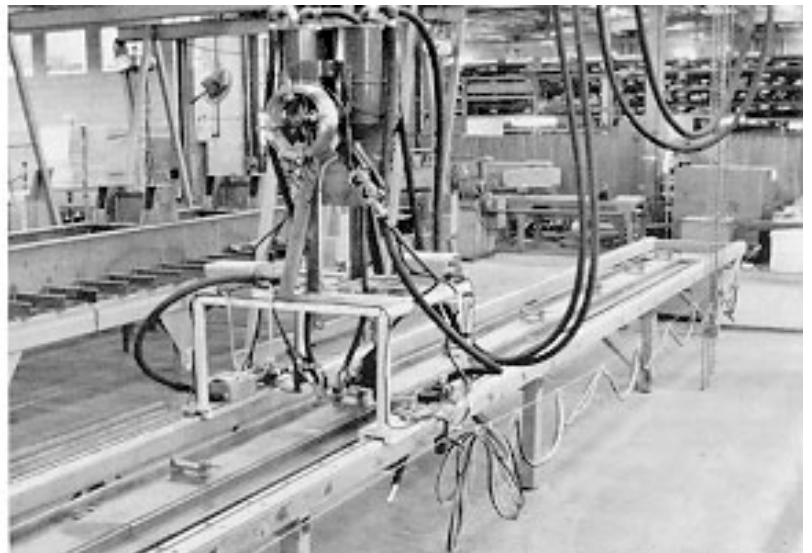
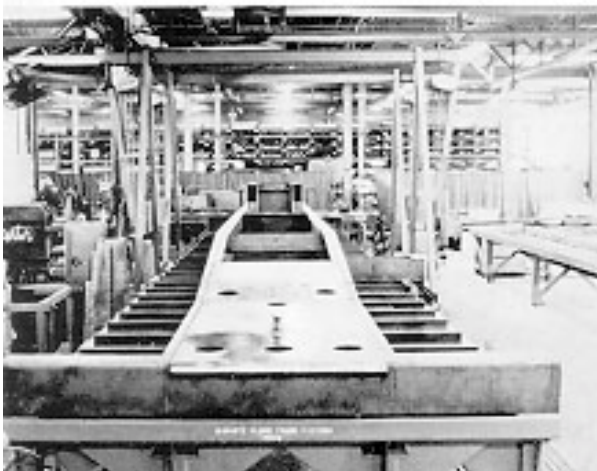
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**Application:** Welding frames for semi-trailers.

**Process:** Dual sub arc welding.

**Equipment:** MUG-O components and welding gantry built by customer.

**Savings:** Productivity increased 12 times with improved quality and appearance.

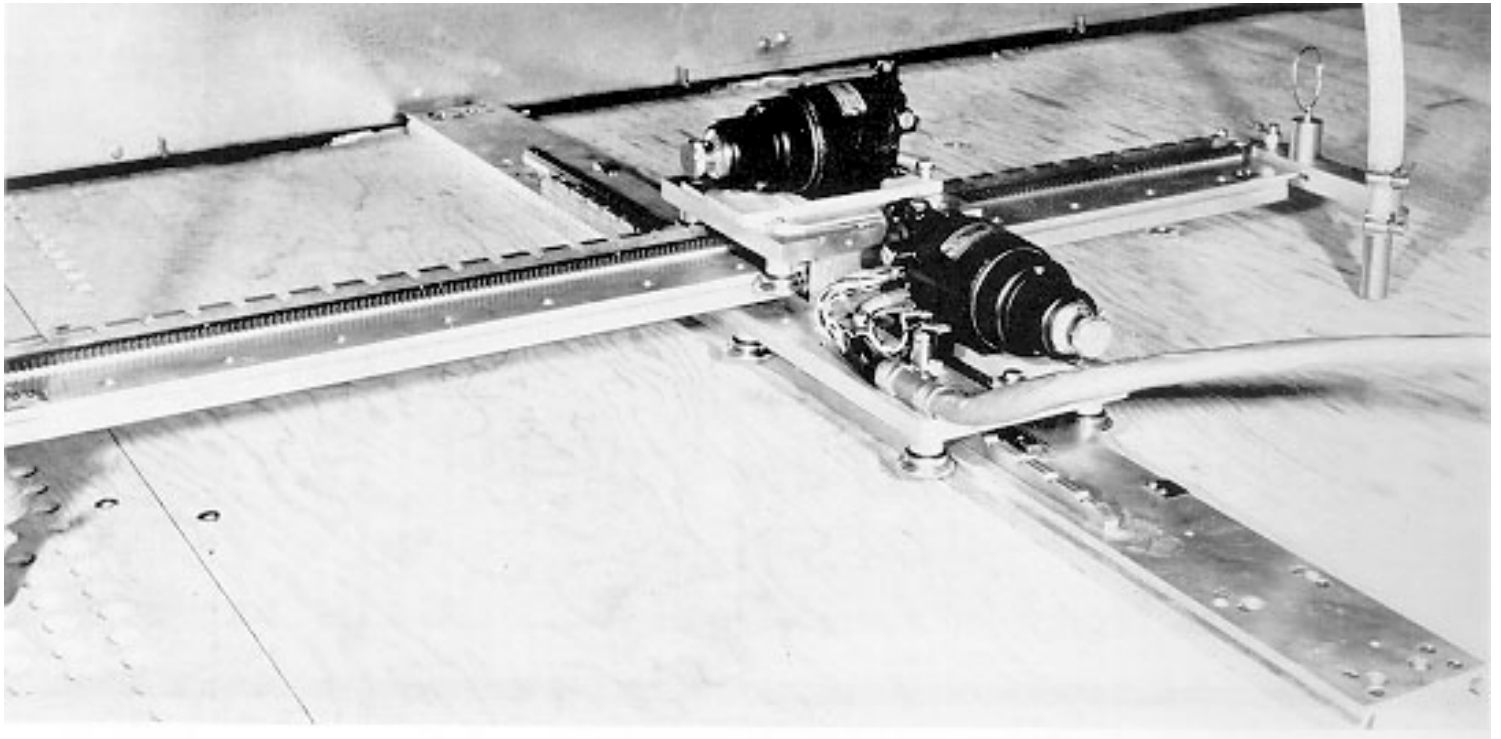


**Application:** Reactor inspection.

**Process:** Eddy current testing.

**Equipment:** (2) Bug-O DC II's, Rail and fixturing by customer.

**Savings:** Reduction in shutdown time for inspection and greater accuracy of probe placement.

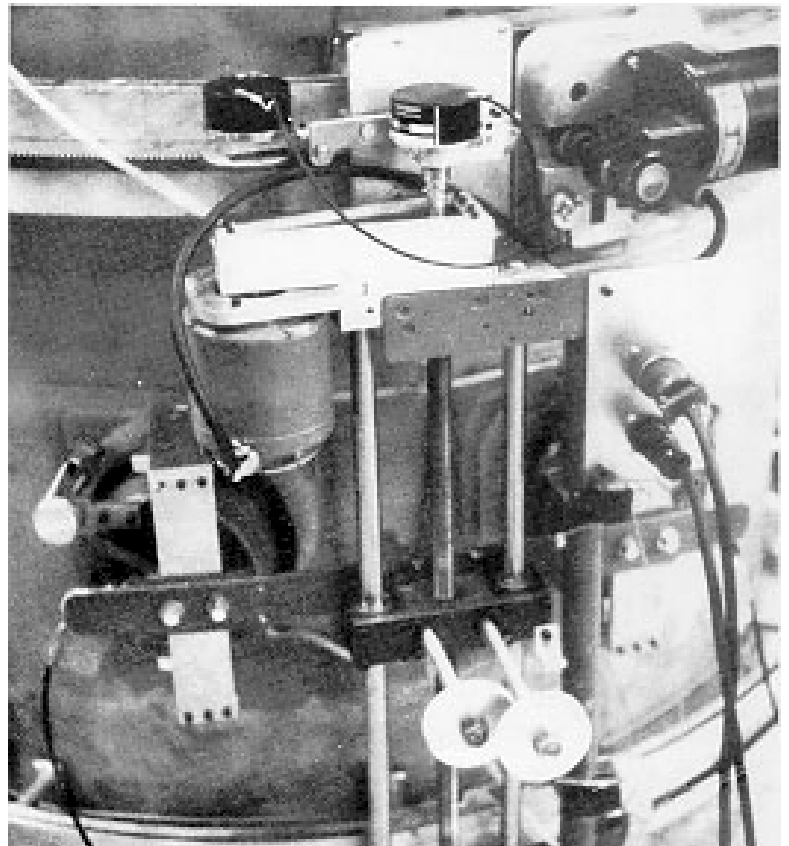


**Application:** Holographic scanning of missiles.

**Process:** Holography

**Equipment:** Bug-O Bent Rails, ROL-O Carriage and Trailer mounted on customer's fixture.

**Savings:** Portable inspection device solved difficult inspection problem.





# Applications

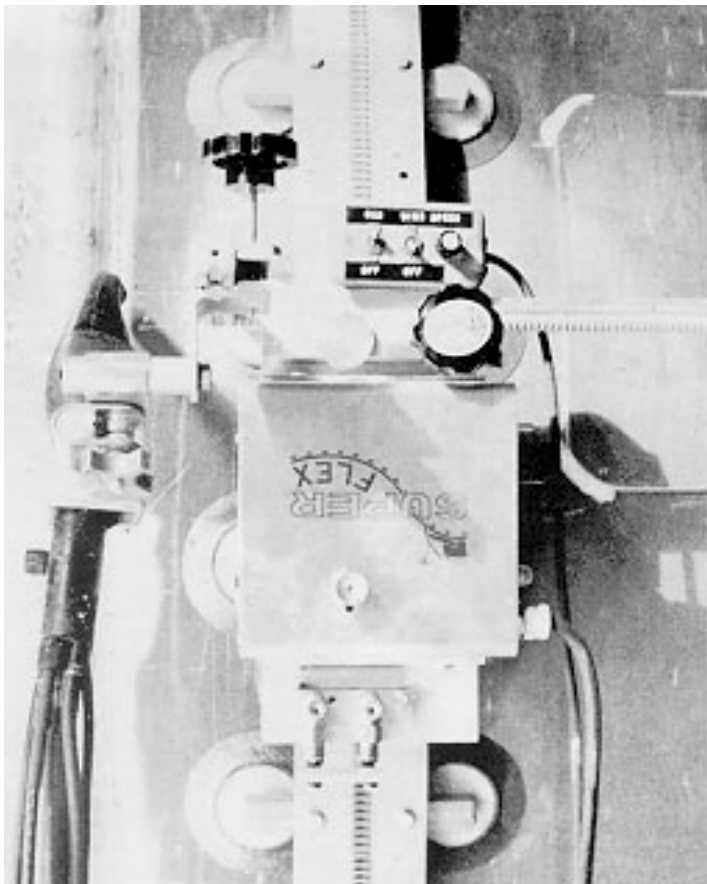
## Circular or Radial Welding

**Application:** Increase length of Aluminum Liquefied Gas Trailers.

**Process:** TIG welding.

**Equipment:** Super-Flex Welding Kit with Vacuum Support Kit.

**Savings:** Welding time reduced 20% without distortion.



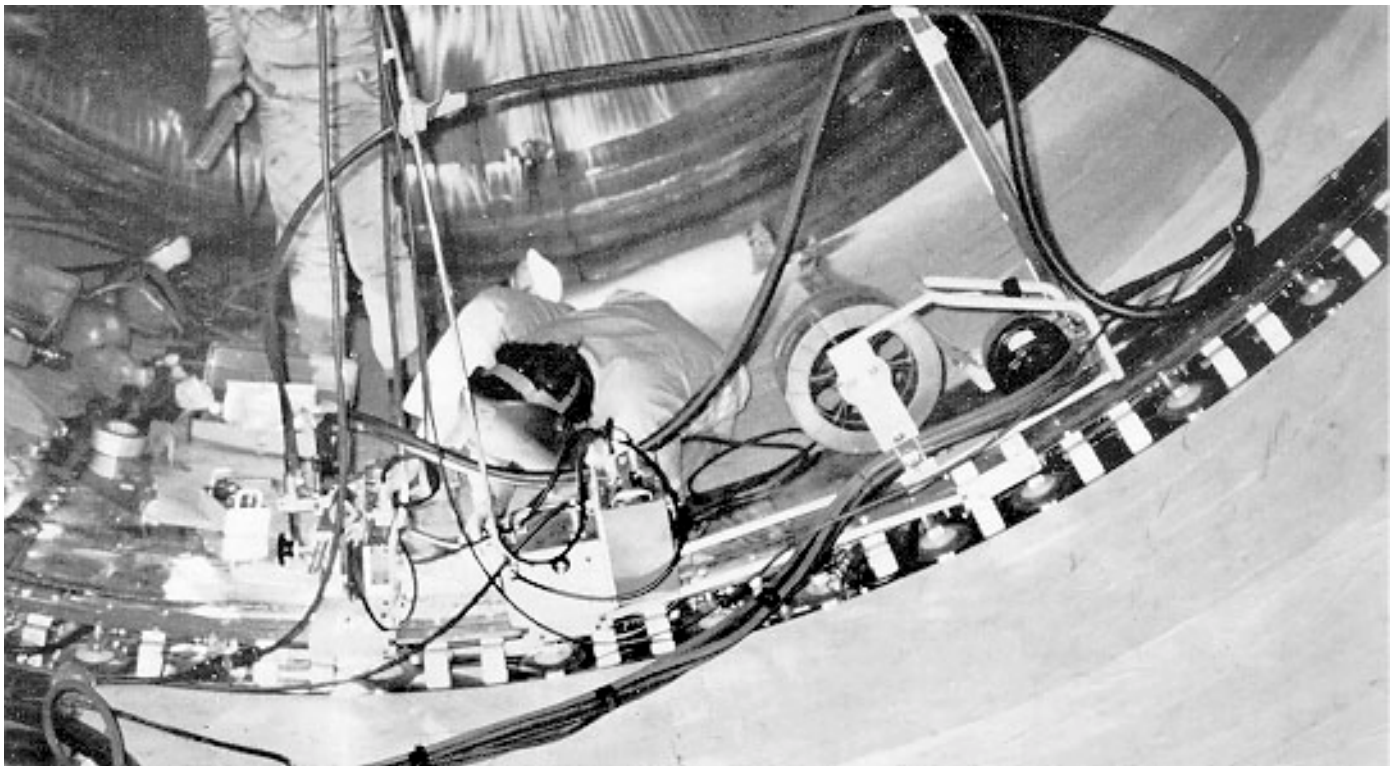
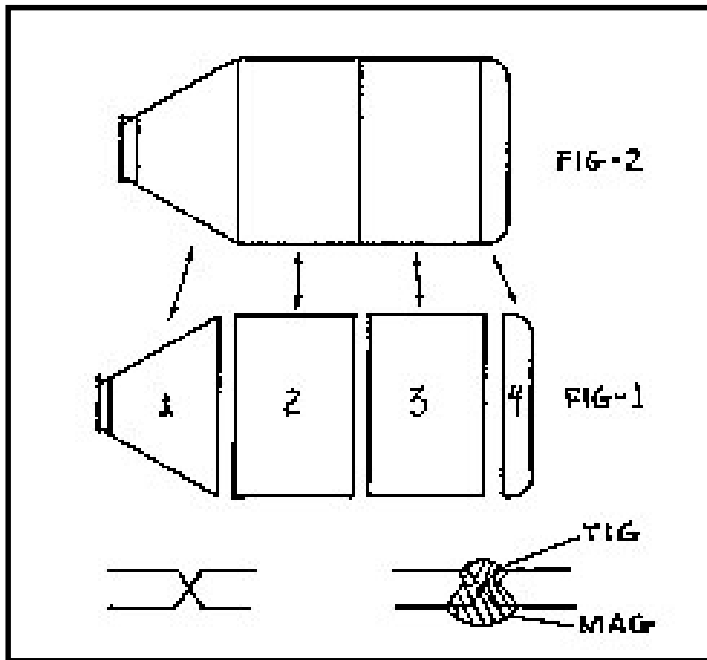


**Application:** Field assembly of large Aluminum Tank with restricted access.

**Process:** TIG and MAG welding.

**Equipment:** Super-Flex and turning rolls used to keep welding at 5:00 - 7:00.

**Savings:** 75 - 85% reduction in welding time with excellent quality.

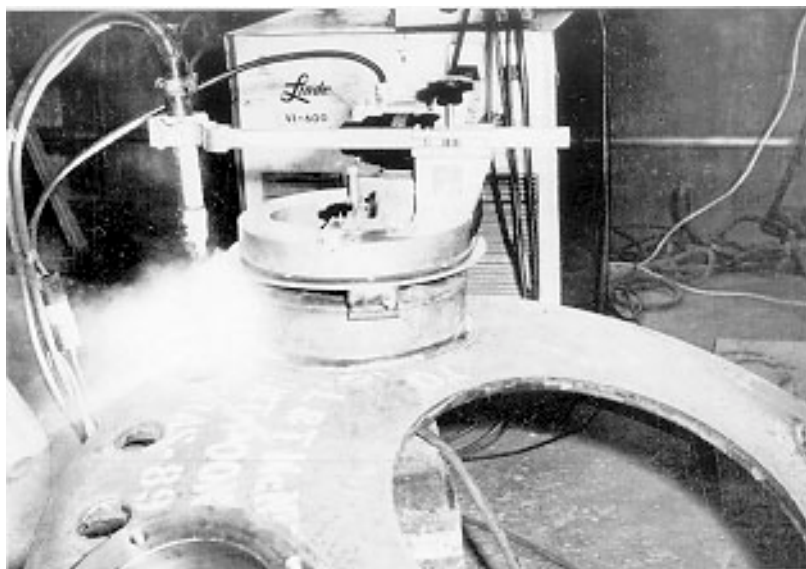


**Application:** Welding 3" (95 mm) thick nozzles to 1" (25 mm) thick heads, 59" (1500 mm) in diameter.

**Process:** MIG welding.

**Equipment:** HOB-O.

**Savings:** 50% on labor and 15% on consumables.



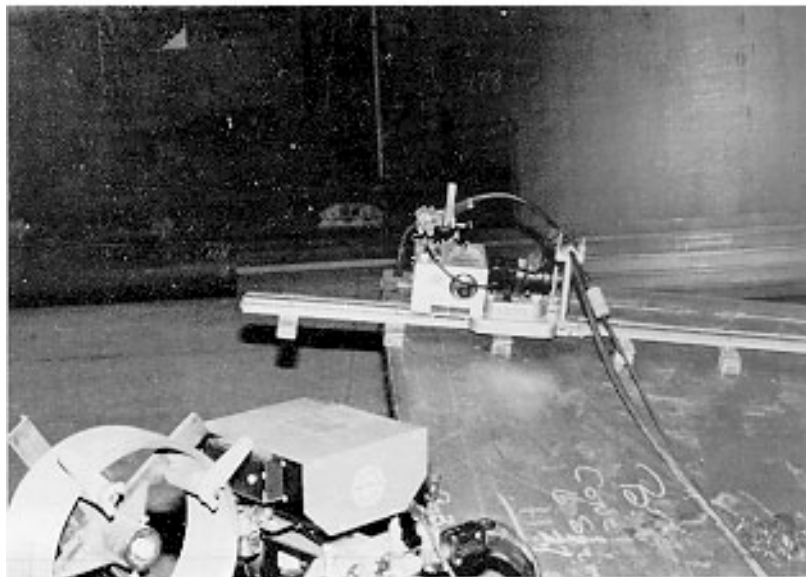
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**Application:** Fabricate large cones for water storage tanks.

**Process:** Flux cored arc welding.

**Equipment:** Bug-O Speed Weaving Kit.

**Savings:** 72 man hours per cone over manual welding.



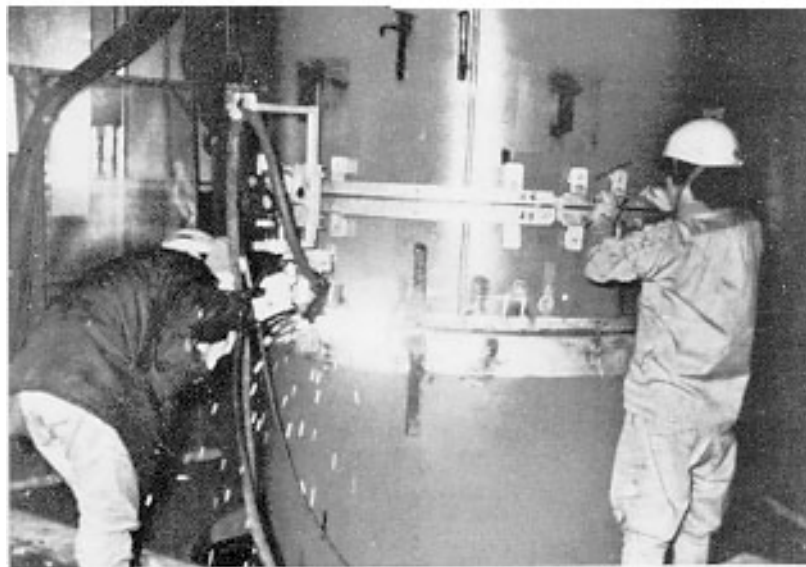
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**Application:** Assembly of tubular tower.

**Process:** MIG welding.

**Equipment:** Bug-O ROL-O carriage and bent rails with magnets.

**Savings:** Reduced distortion and increased high quality production.



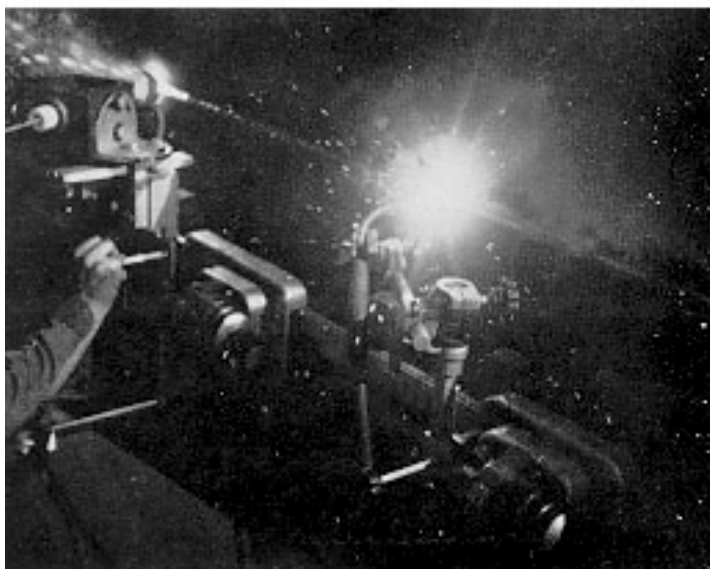


**Application:** Welding ships hulls.

**Process:** Automatic arc gouging and Flux cored arc welding.

**Equipment:** Bug-O General Welding Kit and Flex Rail.

**Savings:** Welding time reduced 75% and stub waste decreased 50%.

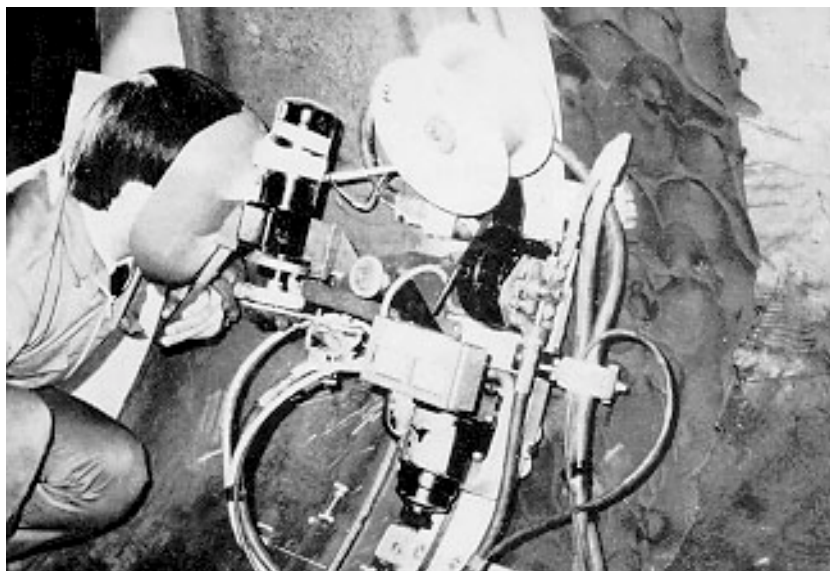


**Application:** Welding inside water line pipe.

**Process:** MIG welding.

**Equipment:** Bug-O ROL-O Carriage and Trailer on Bent Rails with Magnets and Wire Feeder mounted by customer.

**Savings:** Easy set up produced quality joints — twice as fast as manual welding.



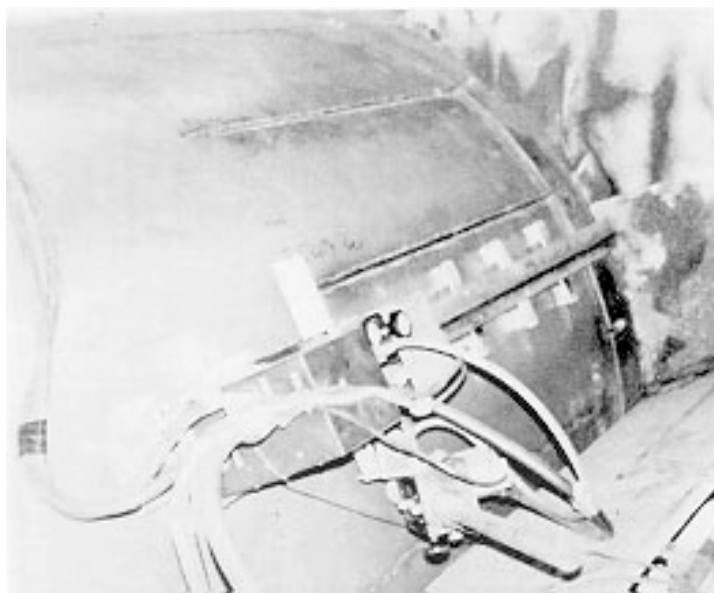


**Application:** Shrink inner yoke of generator housing.

**Process:** Arc gouging, oxyfuel gas cutting and MIG welding.

**Equipment:** Bug-O ROL-O Carriage, Trailer and Automatic Arc Gouging Unit.

**Savings:** 5 -7 days less downtime that calculated for repair saved \$800,000.00.



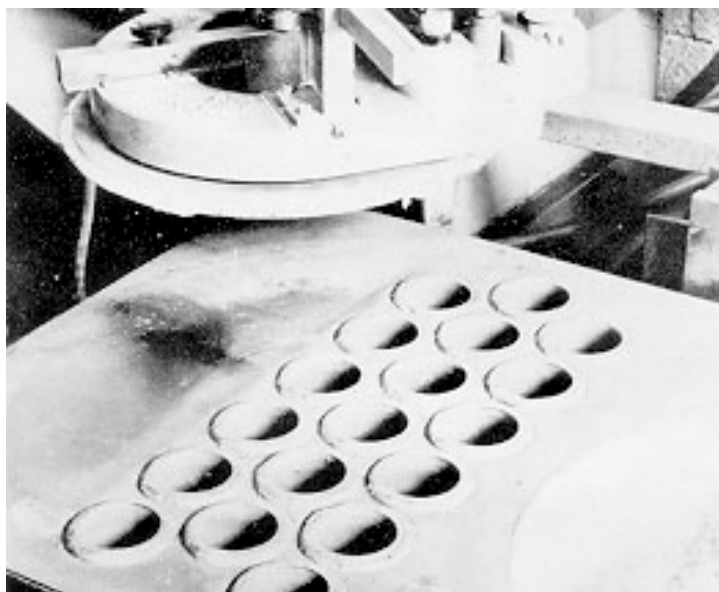
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**Application:** Tube to tubesheet welding.

**Process:** MIG welding.

**Equipment:** HOB-O mounted on customer's fixture.

**Savings:** 50% reduction in welding time, substantial improvement in appearance and quality.

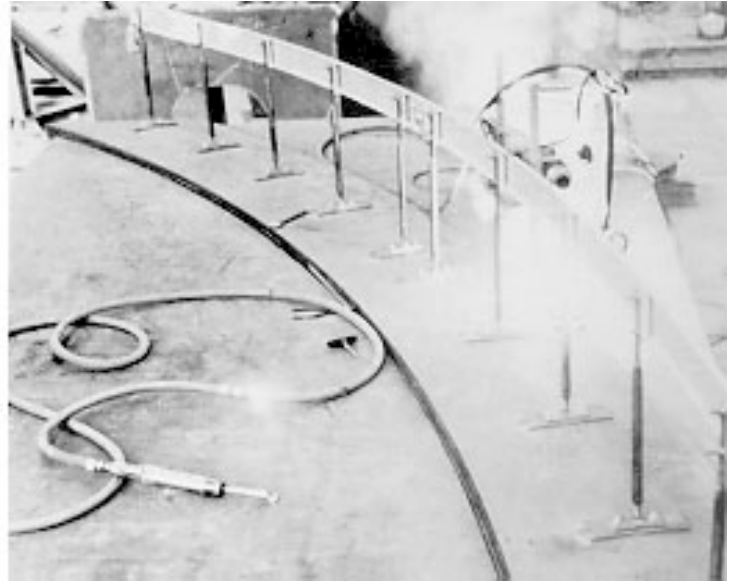
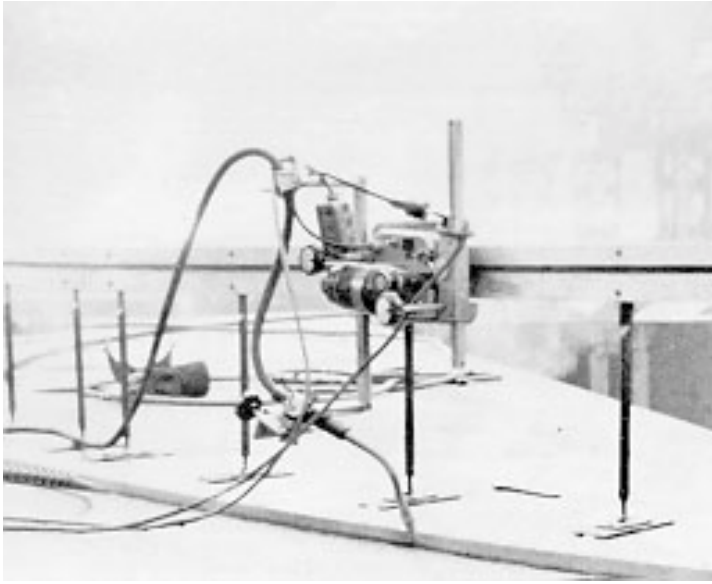


**Application:** Welding roller path flange plate on power shovel dragline.

**Process:** Semiautomatic sub arc welding.

**Equipment:** Bug-O DC III and Flex Rail.

**Savings:** High Quality, repeatable welds and reduced material handling.



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**Application:** Welding rollers for asphalt pavers.

**Process:** Flux Cored arc welding.

**Equipment:** HOB-O

**Savings:** Production increased 150% with improved quality and appearance.



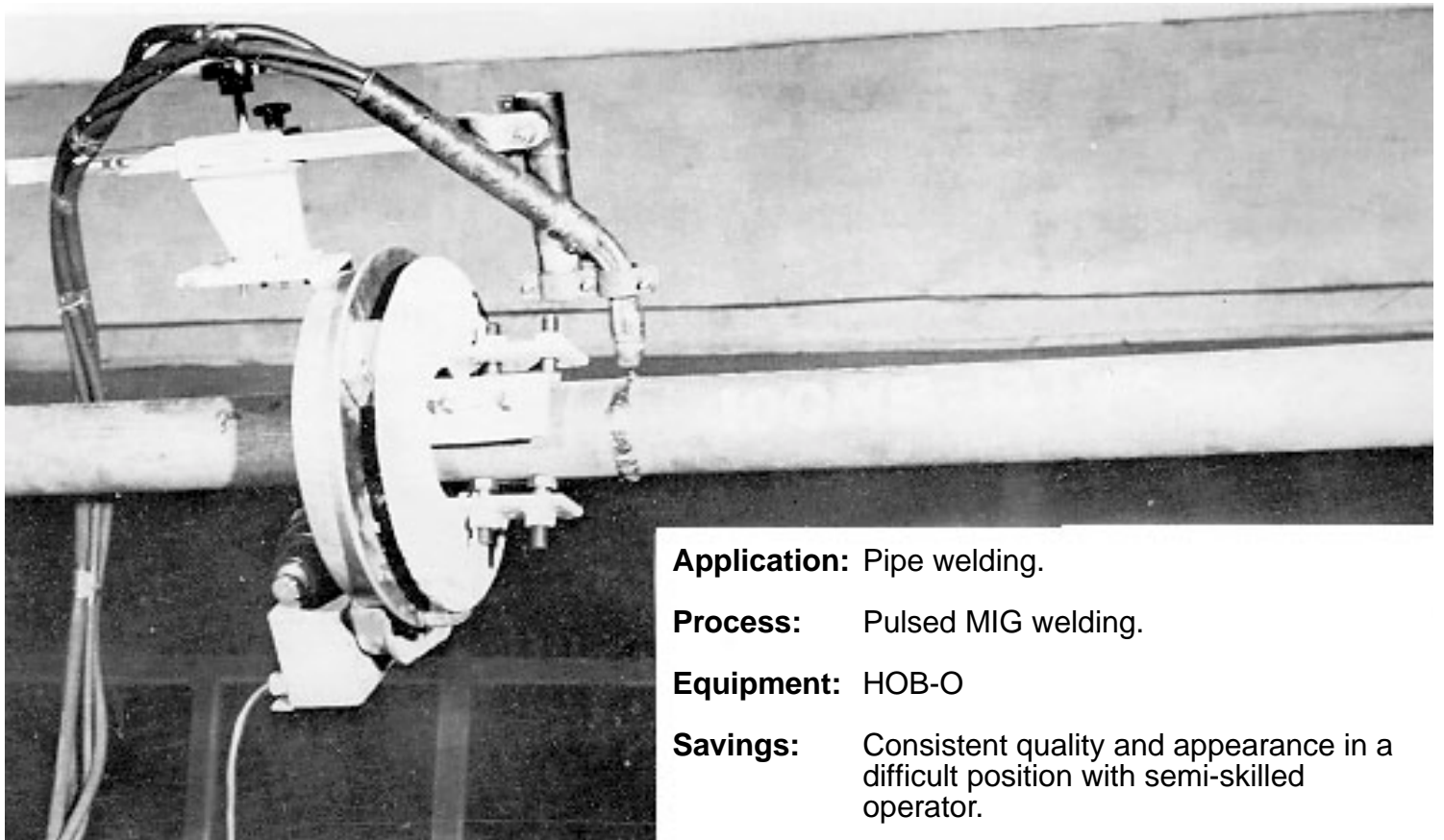
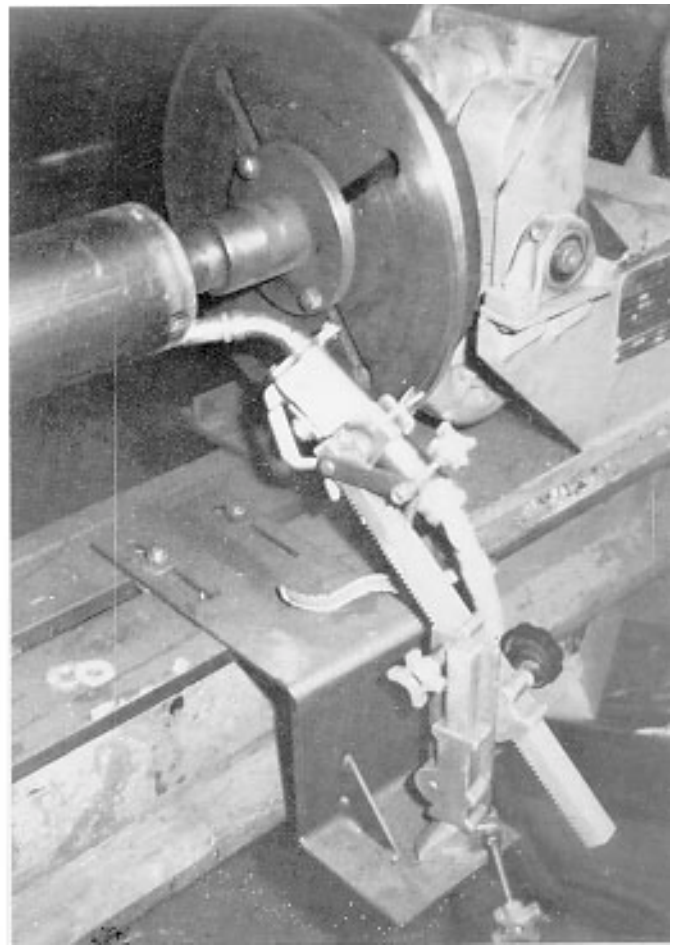


**Application:** Welding heads on the ends of rolls.

**Process:** MIG welding.

**Equipment:** Bug-O Four Motion Torch Support Group.

**Savings:** Reduced cost by using standard components.



**Application:** Pipe welding.

**Process:** Pulsed MIG welding.

**Equipment:** HOB-O

**Savings:** Consistent quality and appearance in a difficult position with semi-skilled operator.

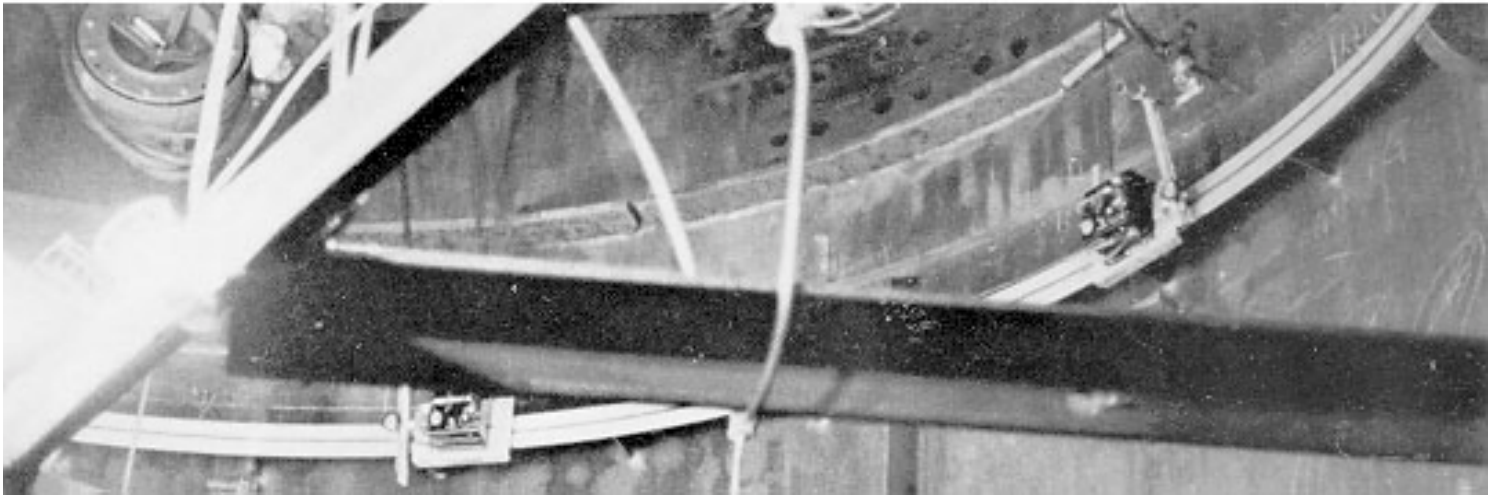
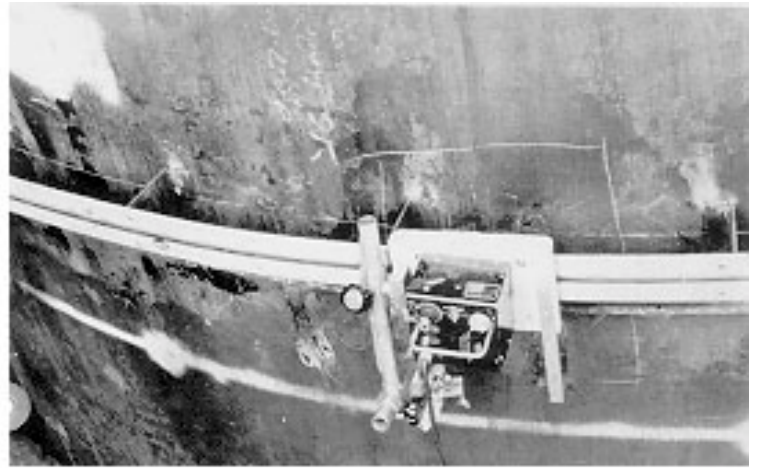


**Application:** Welding sections of basic oxygen furnaces.

**Process:** Flux cored arc welding.

**Equipment:** Bug-O DC III, Heavy Duty Torch Mounting Groups and Semi-Flex Rails.

**Savings:** 500 man hours and operator comfort improved greatly.



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**Application:** Welding nozzles on small tanks.

**Process:** MIG Welding.

**Equipment:** CON-4404 mounted on customer's fixture.

**Savings:** Production increased 400%.





# Applications

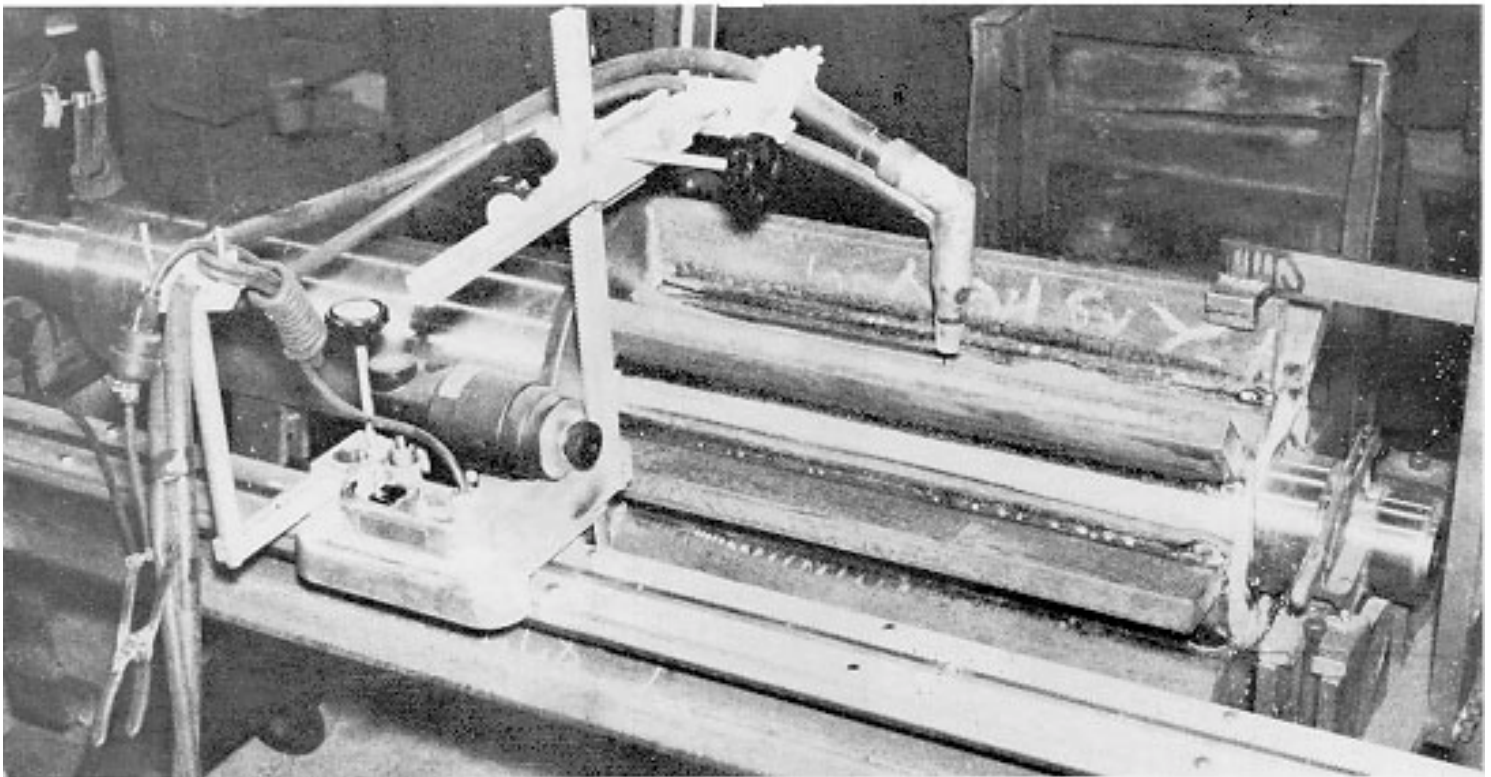
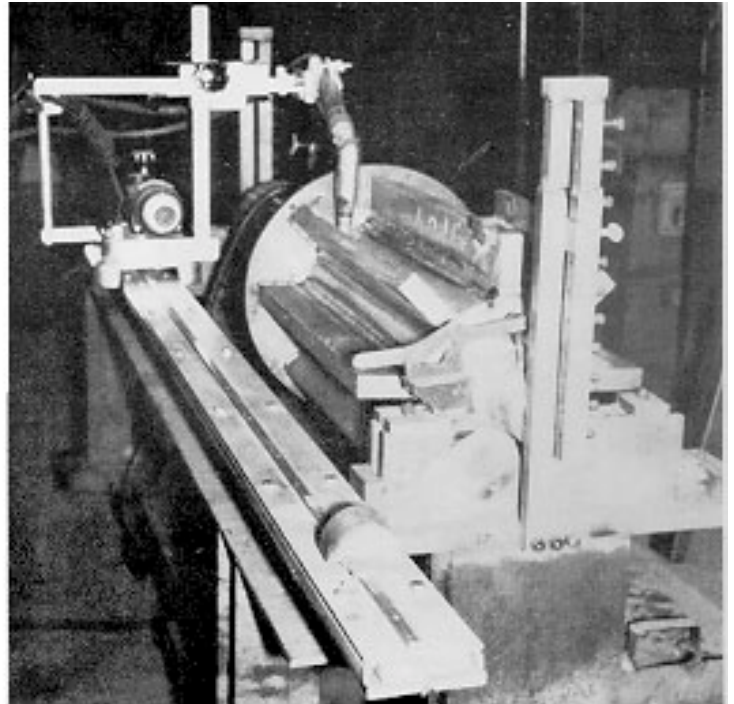
## Sub Arc Welding

**Application:** Welding ribs to a shaft.

**Process:** Sub arc welding.

**Equipment:** Bug-O General Welding Kit.

**Savings:** Welding time reduced 38% with improved quality and appearance.



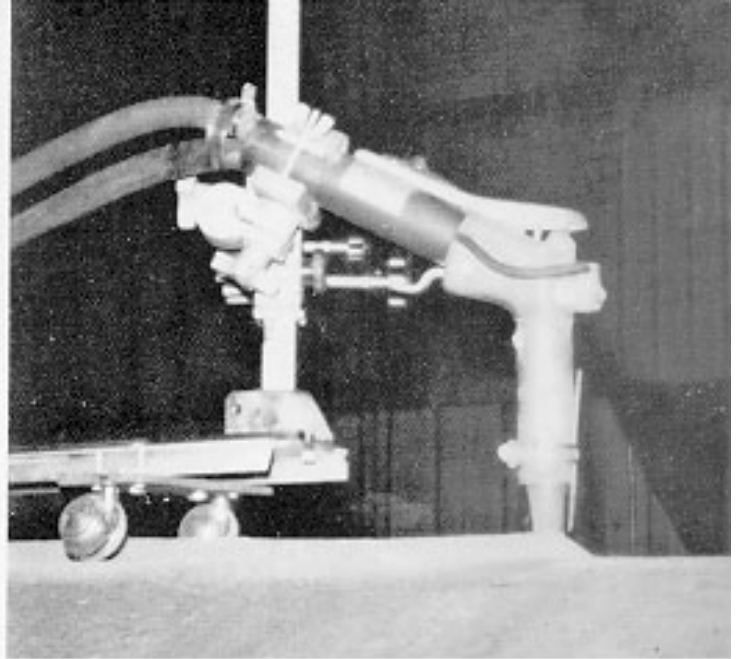
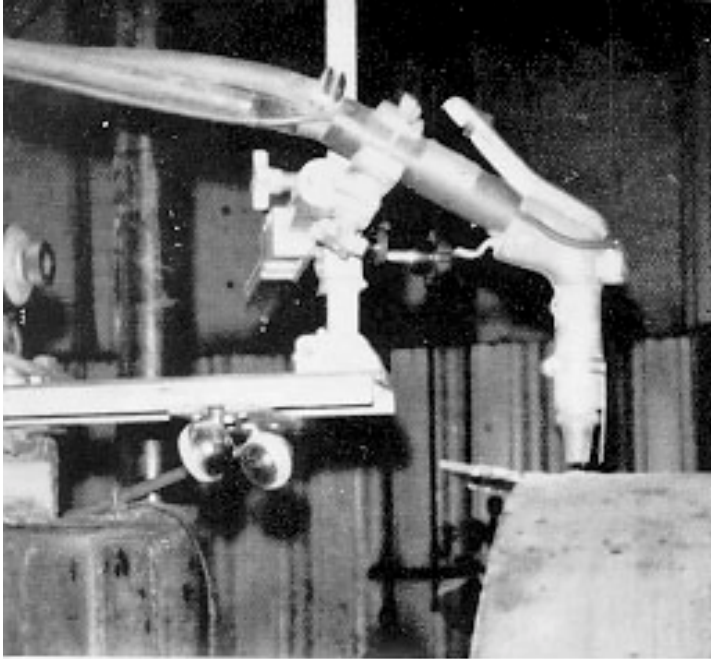


**Application:** Longitudinal welding on stainless steel tanks.

**Process:** Sub arc welding.

**Equipment:** Bug-O General Welding Kit with wheels supplied by customer.  
Note: Carriage is fixed on table and rail with rollers and is moved along weld joint.

**Savings:** Achieved the benefit of using a manipulator with a low cost kit.

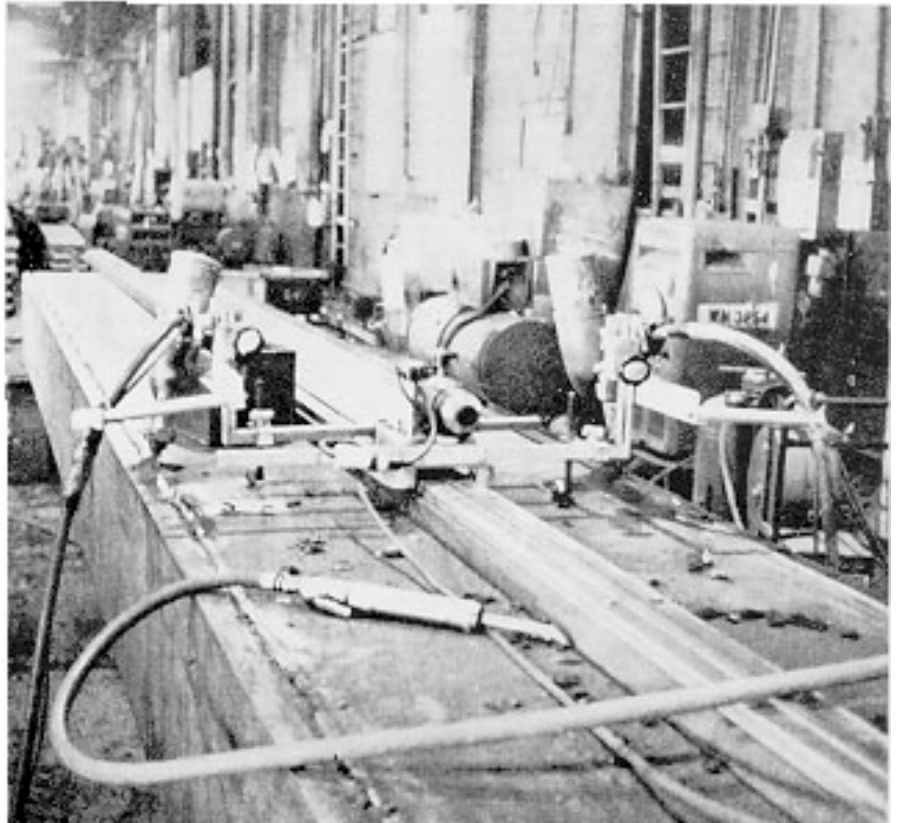


**Application:** Dual welding on box girder.

**Process:** Sub arc welding.

**Equipment:** Bug-O General Welding Kit with Double Torch Welding Group.

**Savings:** One operator made two welds simultaneously saving \$1,200.00 on 46 box girders.





**Application:** Welding bearing journals and stubs.

**Process:** Sub arc welding.

**Equipment:** HOB-O with adaptor made by customer.

**Savings:** Weld quality and appearance greatly improved with portable unit which reduced material handling.



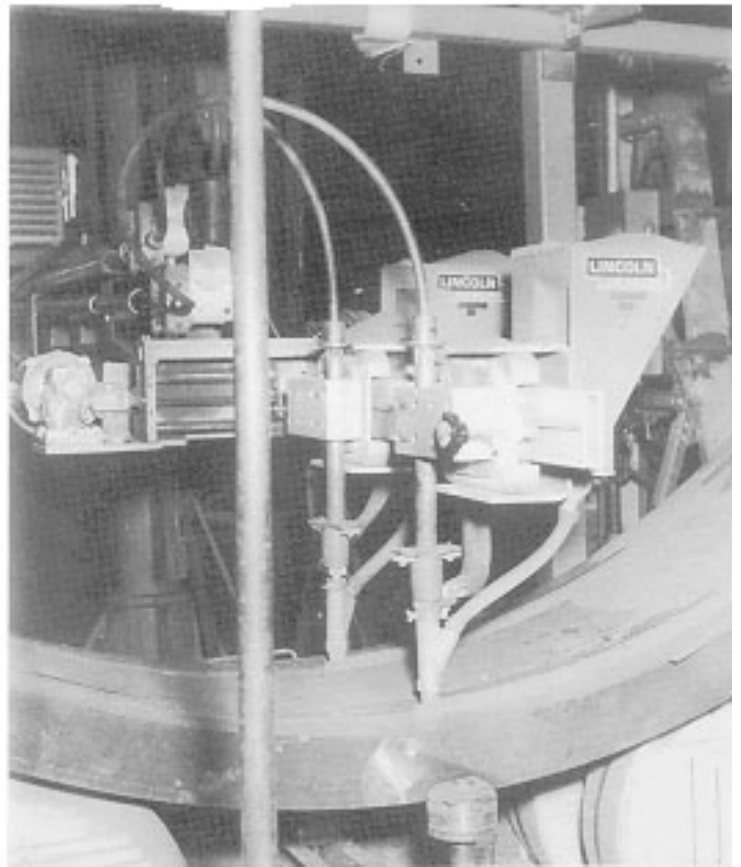
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**Application:** Make fixture to mount two automatic welding heads.

**Process:** Sub arc welding.

**Equipment:** MUG-O Spotting Carriages and Heavy Duty Rail mounted on Manipulator.

**Savings:** Fixturing enabled use of second welding head which doubled production.

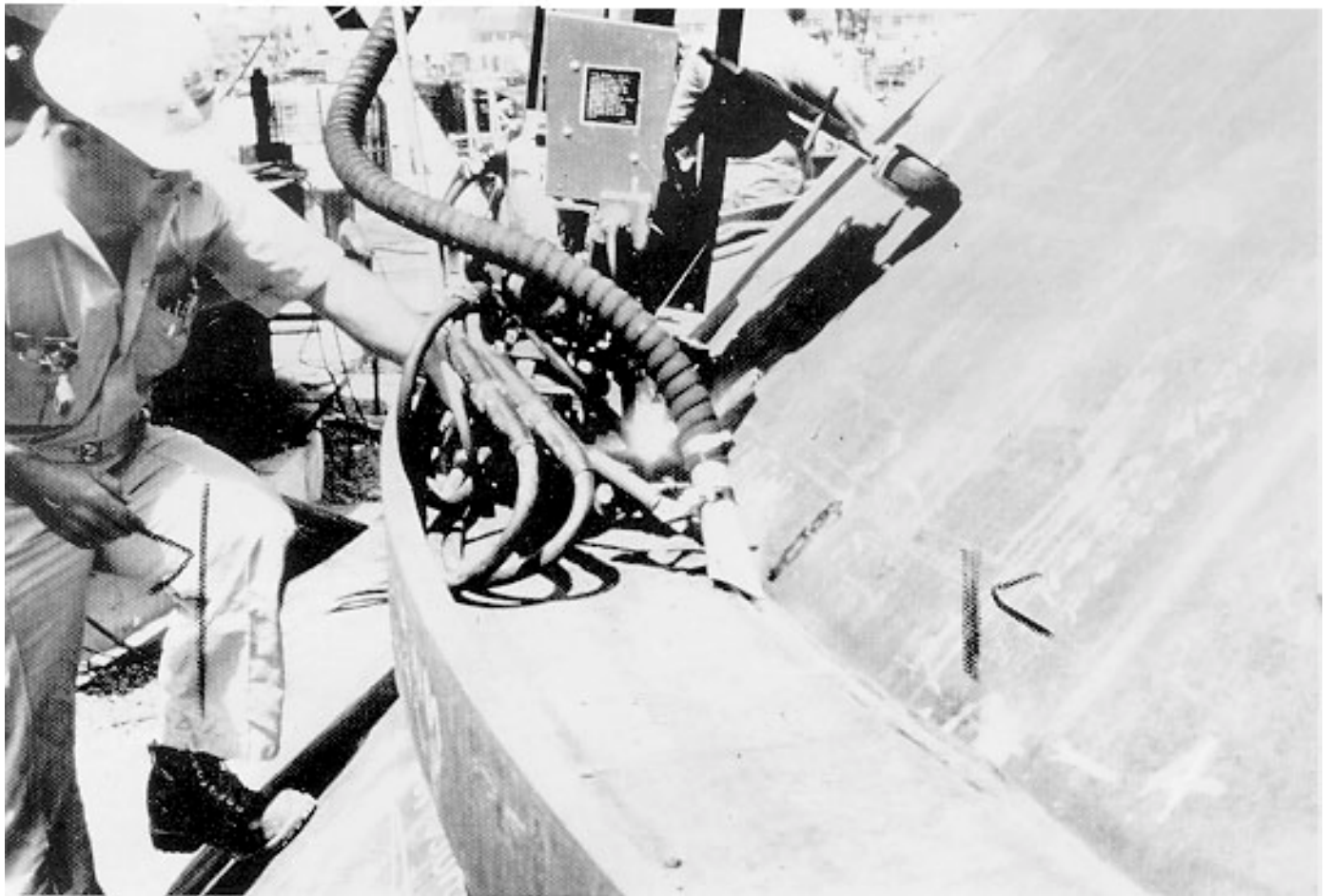
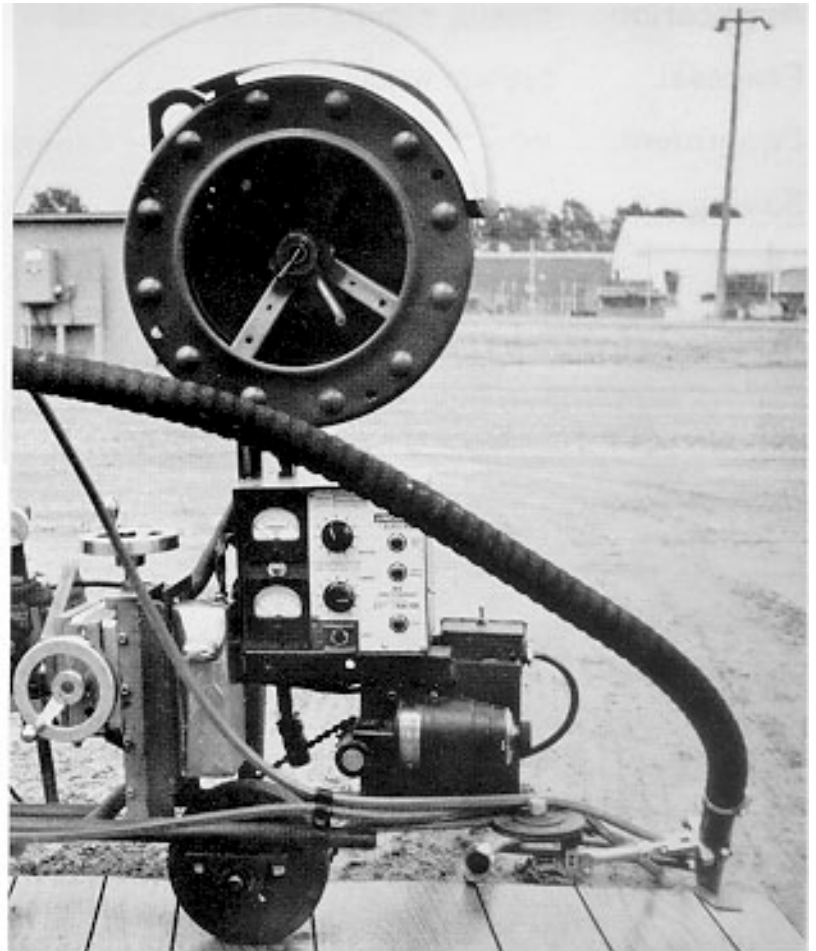


**Application:** Mechanizing custom made tractor.

**Process:** Sub arc welding.

**Equipment:** Bug-O Drive.

**Savings:** 28% increase in deposition efficiency plus substantial time savings.





# Applications

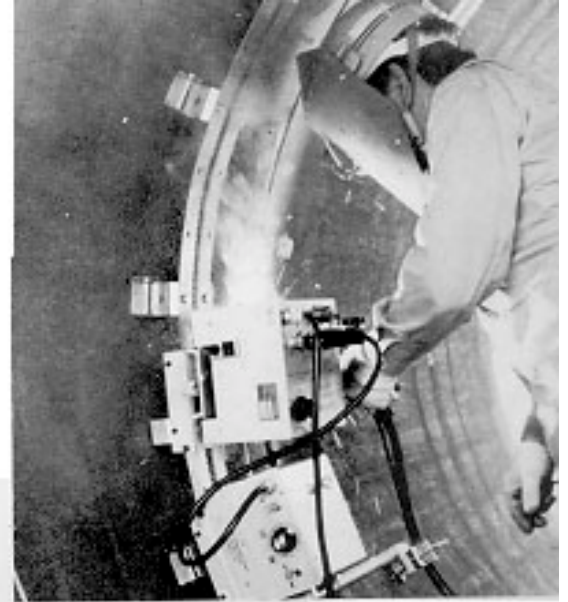
## Weld Weaving

**Application:** Welding underground water pipe.

**Process:** Flux cored arc welding.

**Equipment:** Super-Flex speed weaving kits.

**Savings:** 10 times faster than manual welding with better quality and appearance.



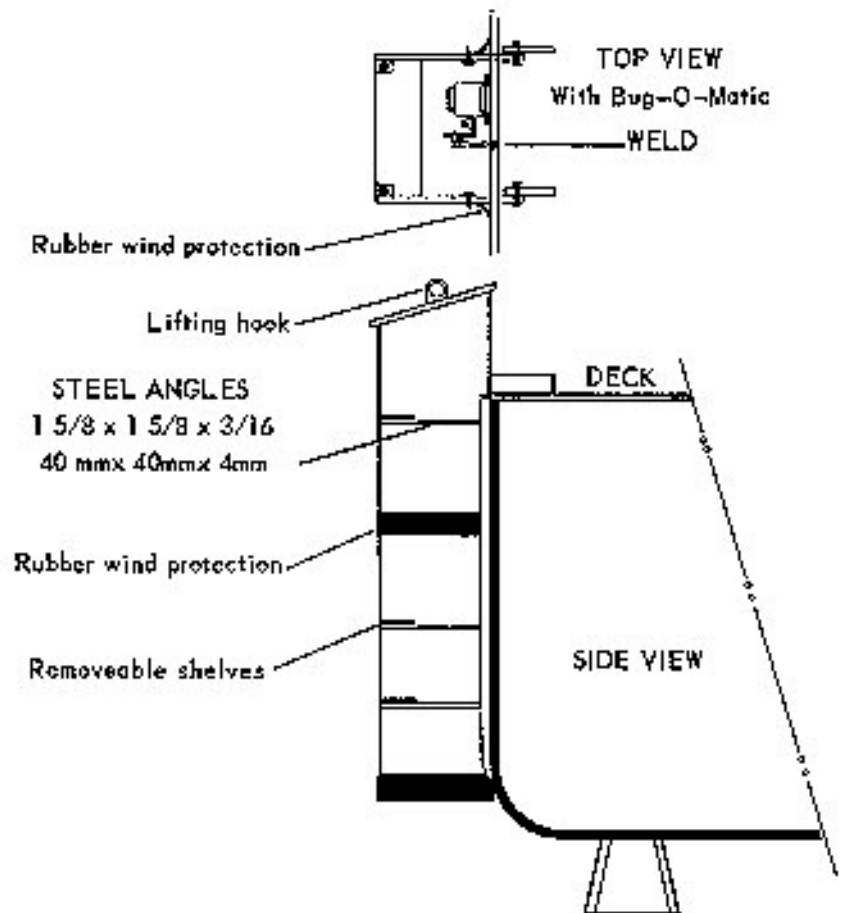


**Application:** Vertical welding on ship hull.

**Process:** MIG welding.

**Equipment:** Bug-O-MATIC with special cage supplied by distributor.

**Savings:** Customized cage and scaffolding protected weld against wind and made it easy for operator to follow the weld.

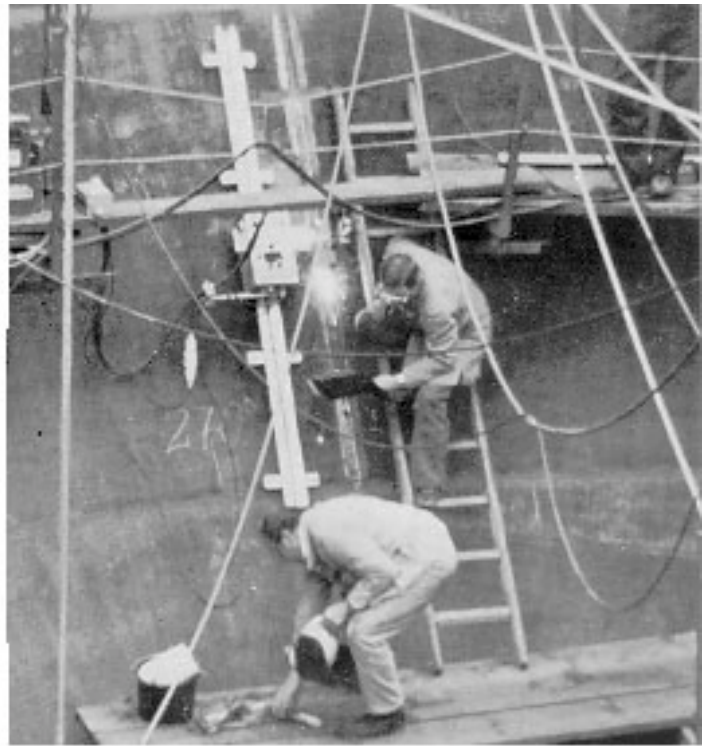
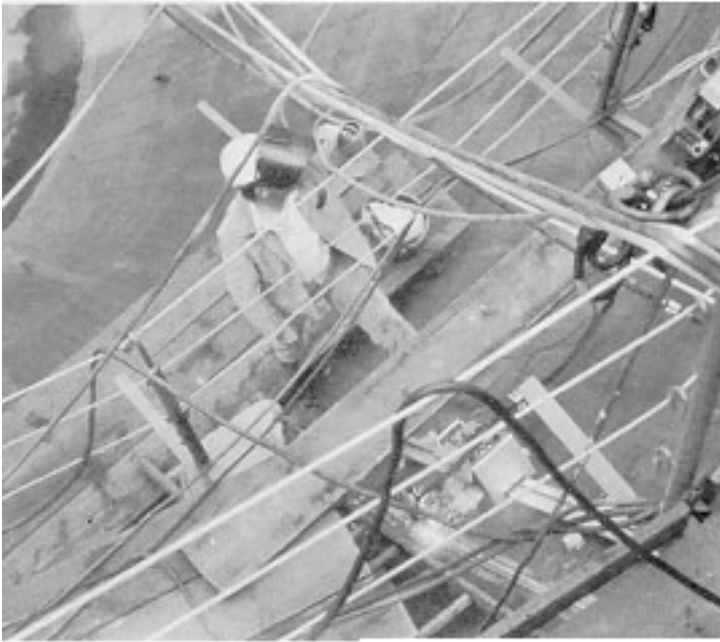


**Application:** Fabrication of a conical water tank.

**Process:** Flux cored arc welding.

**Equipment:** Bug-O-MATIC and flex rail.

**Savings:** 60% faster than manual welding.

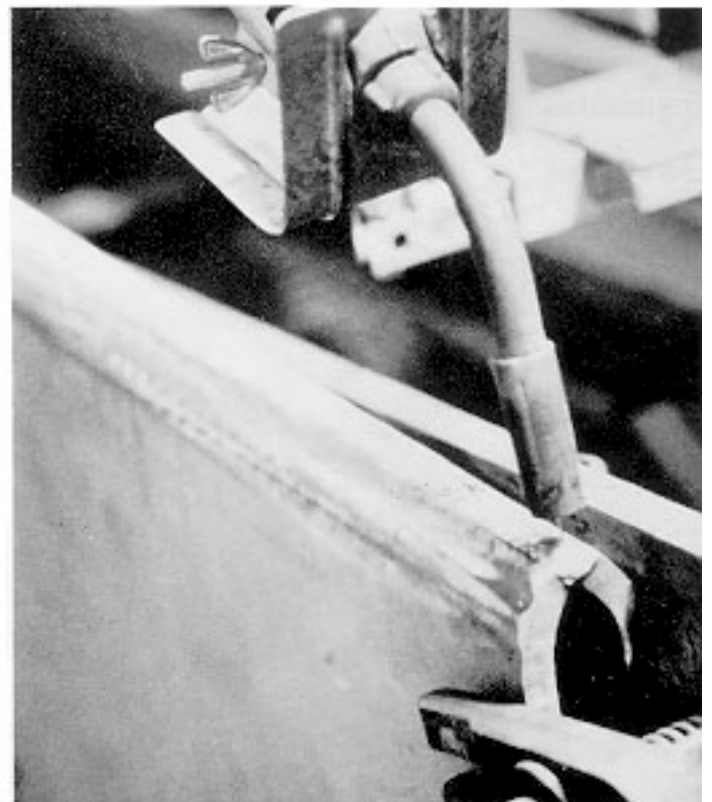


**Application:** Welding irregular shaped vacuum chamber.

**Process:** MIG welding.

**Equipment:** Bug-O Speed Weaving Kit mounted on customer's fixture.

**Savings:** 400% increase in production.

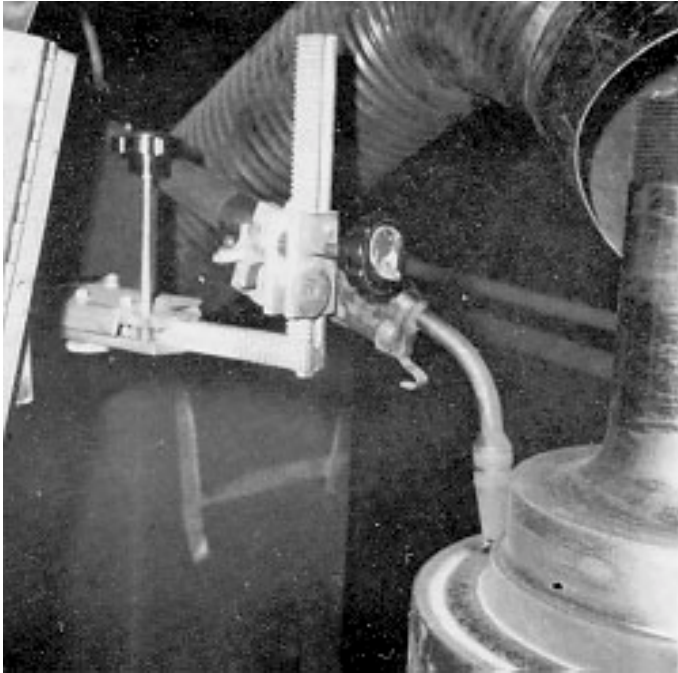


**Application:** Mechanize welding of plate and blanket cylinders with stainless steel tubes.

**Process:** MIG welding.

**Equipment:** Bug-O Speed Weaver.

**Savings:** Production increased 25% which saved \$450.00 per week.



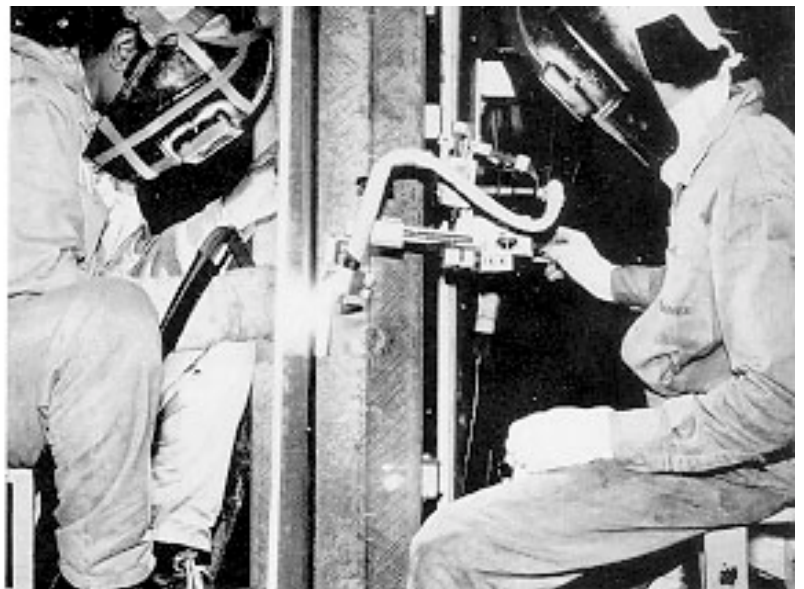
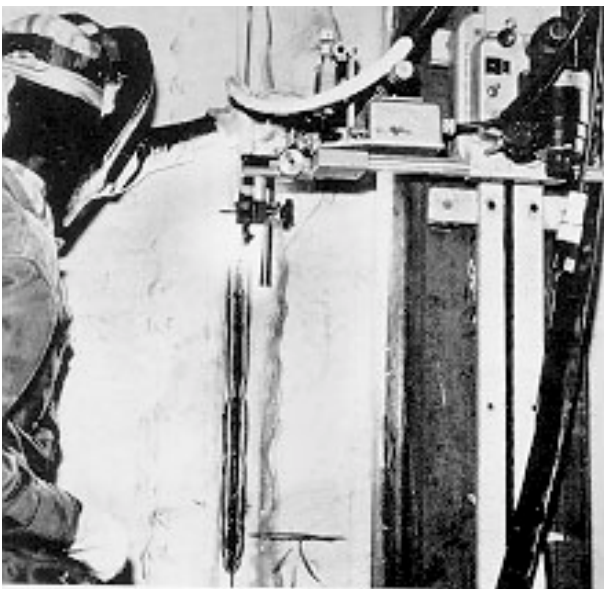
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**Application:** Fabrication of stainless steel furnace cover shells.

**Process:** MIG welding.

**Equipment:** Bug-O Speed Weaving Kit on one side — manual welding on opposite side.

**Savings:** 55% savings in man hours with improved quality.



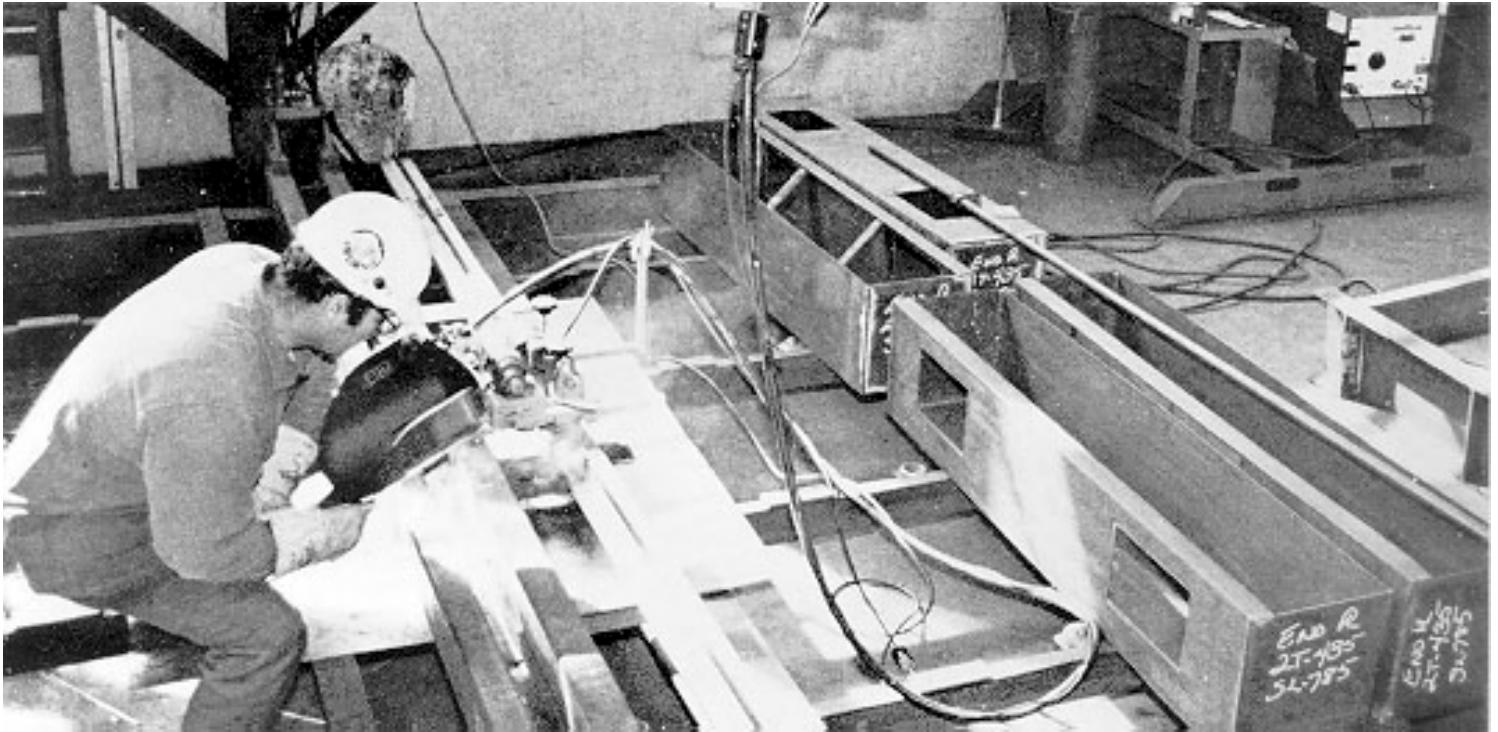


**Application:** Increase production of water treatment equipment.

**Process:** MIG welding.

**Equipment:** Bug-O Speed Weaving Kit.

**Savings:** Production increased with improved quality.

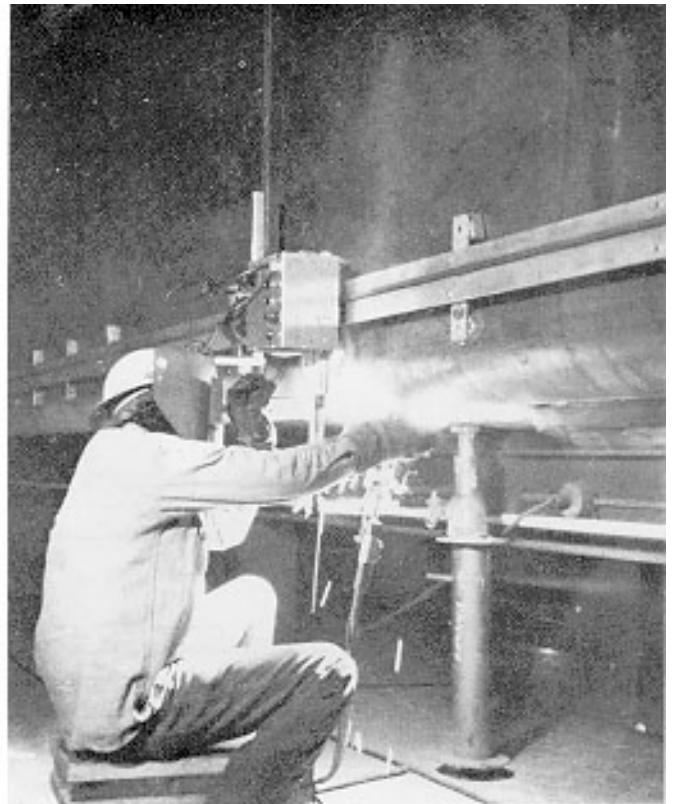
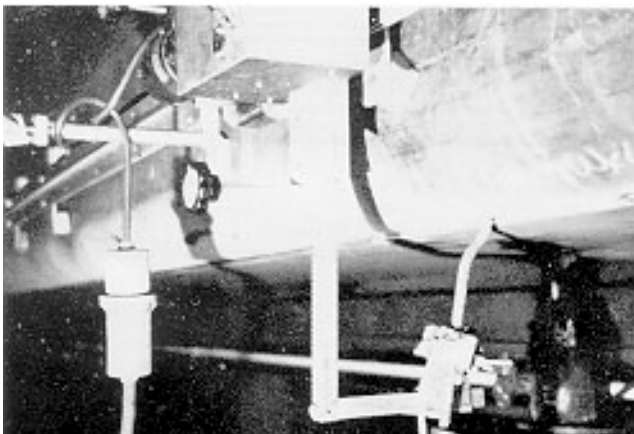


**Application:** Overhead welding on river barges.

**Process:** Flux cored arc welding.

**Equipment:** Bug-O Speed Weaving Kit.

**Savings:** 300% increase in production without operator fatigue.

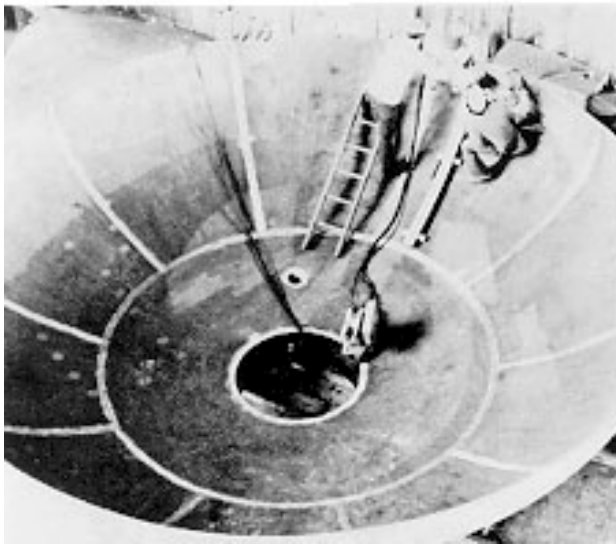
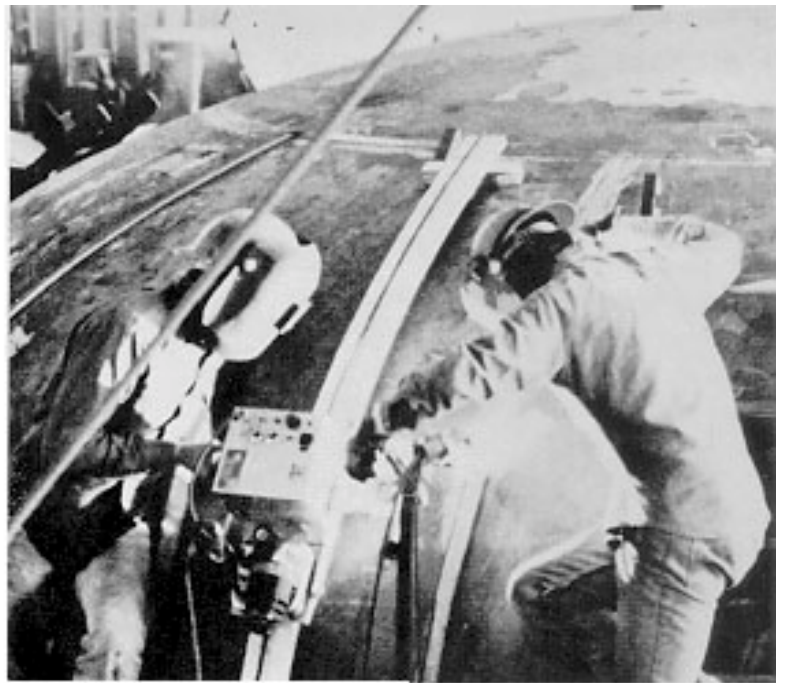


**Application:** Fabricating hemispherical heads.

**Process:** MIG welding.

**Equipment:** Bug-O Speed Weaving Kit and Bent Rails.

**Savings:** \$7,200.00 saved on welding/cleaning time.

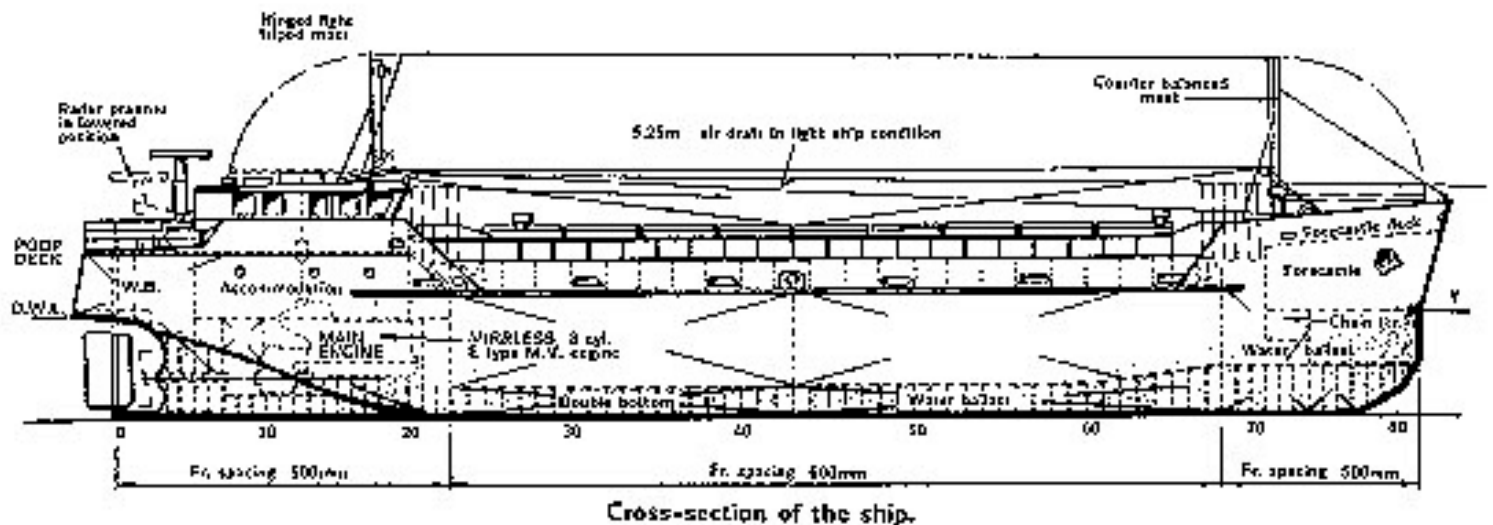


**Application:** Shipbuilding.

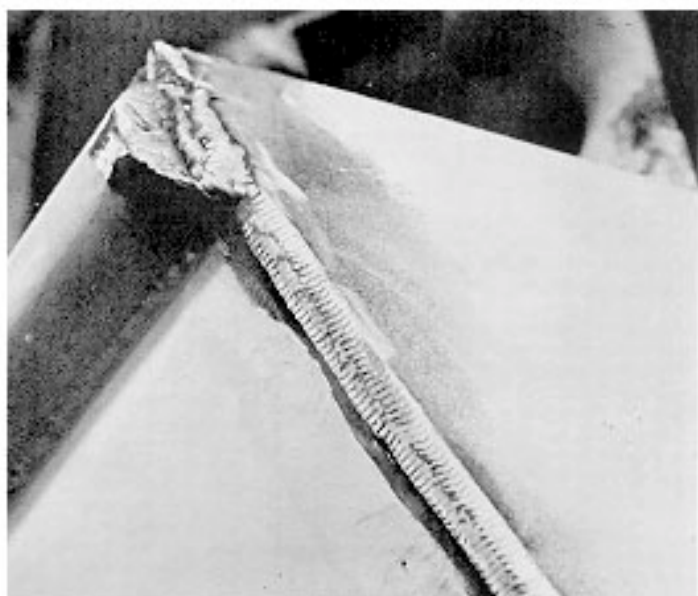
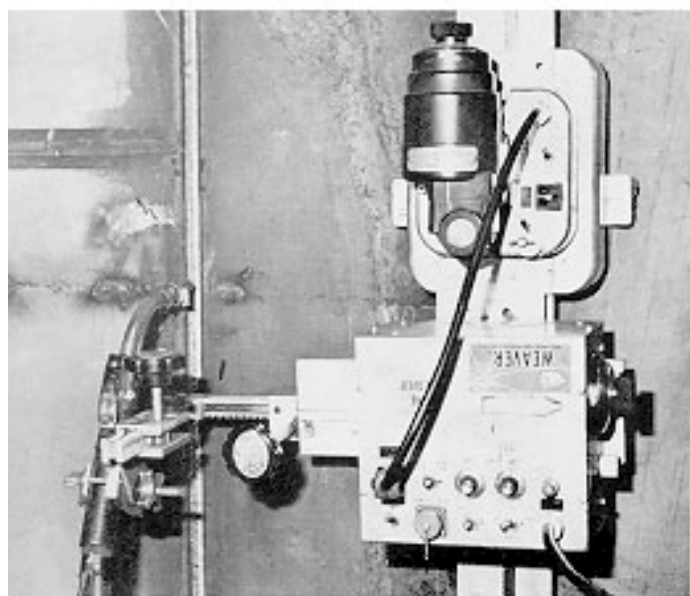
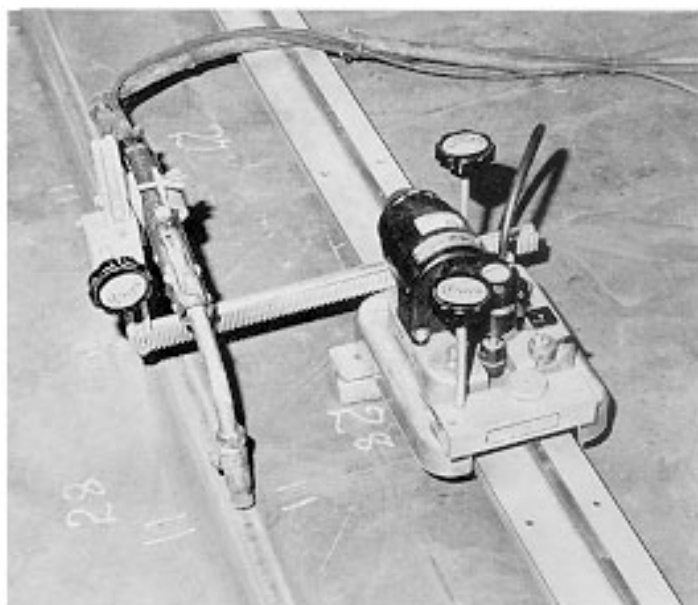
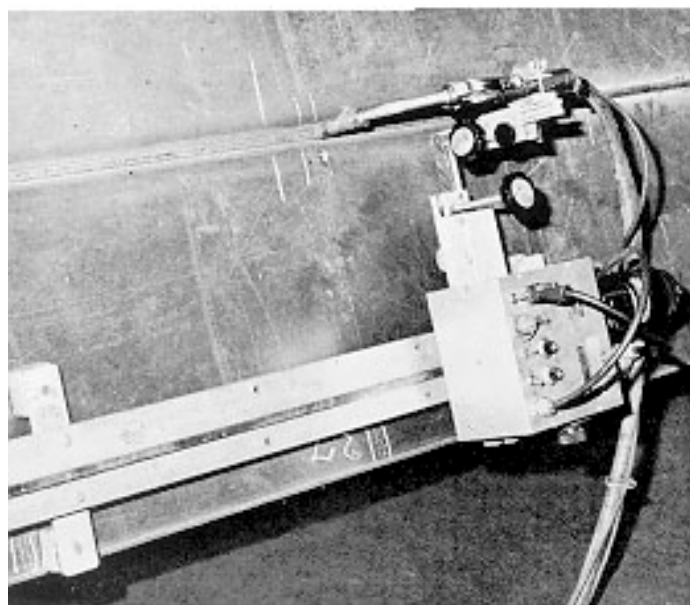
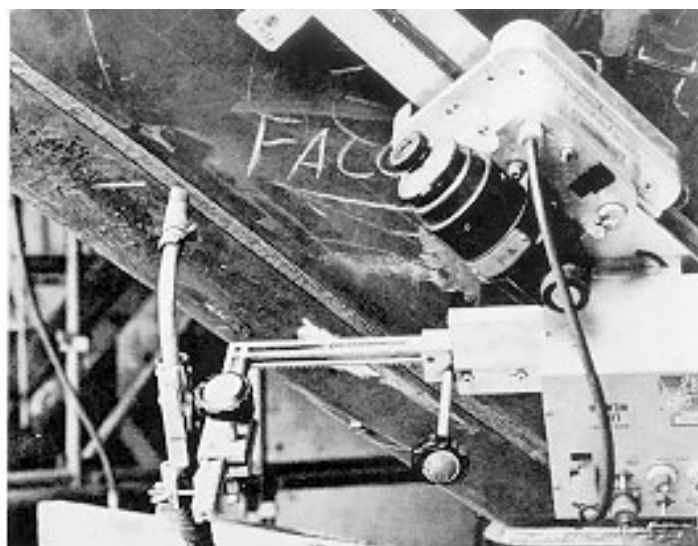
**Process:** MIG welding.

**Equipment:** Bug-O Speed Weaving Kit, Bug-O General Welding Kit.

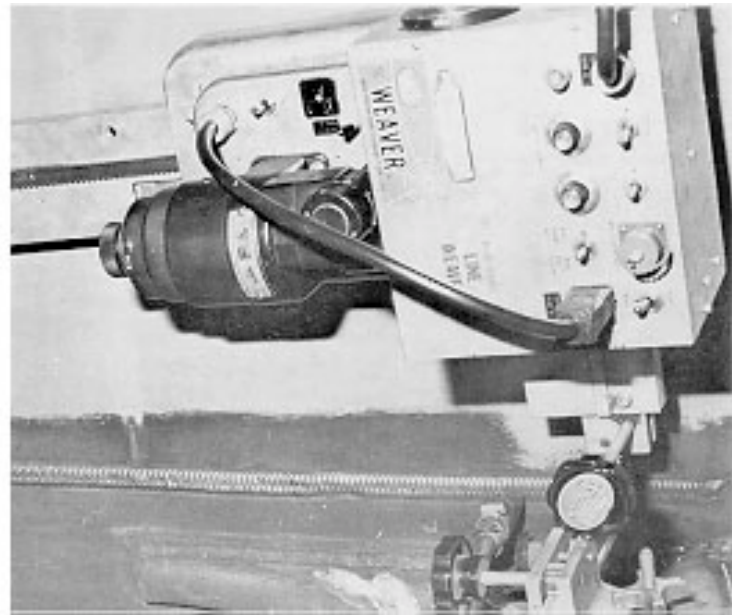
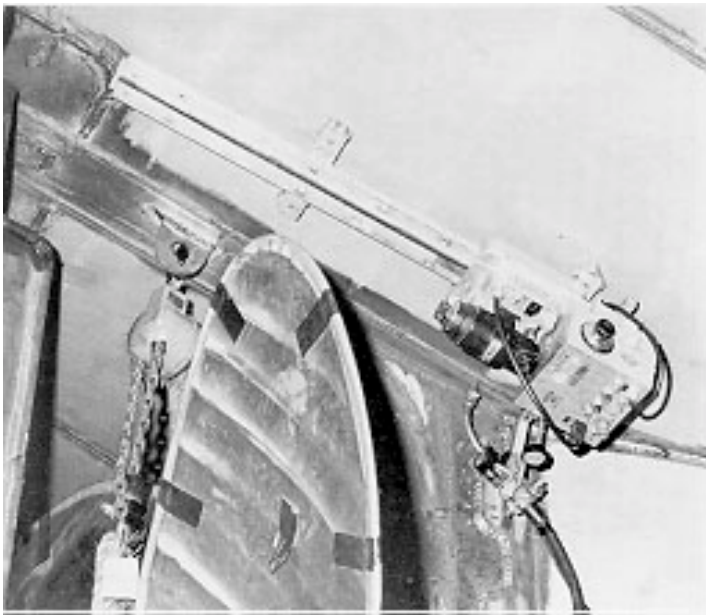
**Savings:** 75% reduction in welding time.











**Application:** Penstock erection.

**Process:** MIG welding.

**Equipment:** Bug-O Speed Weaving Kit and bent rail - shield supplied by customer.

**Savings:** 2000 man hours, 50% of estimated welding time.

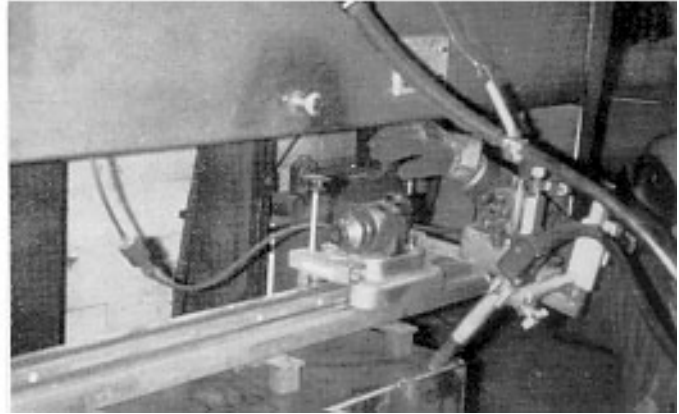
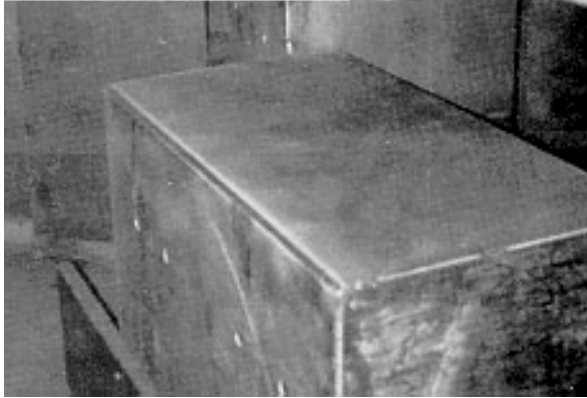
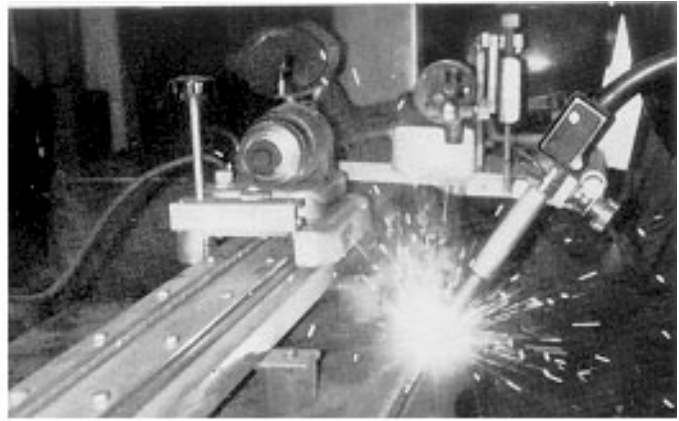


**Application:** Manufacture of hot rolled steel trays.

**Process:** MIG welding.

**Equipment:** Bug-O Weaving Kit.

**Savings:** Substantial increase in production with improved quality and appearance.



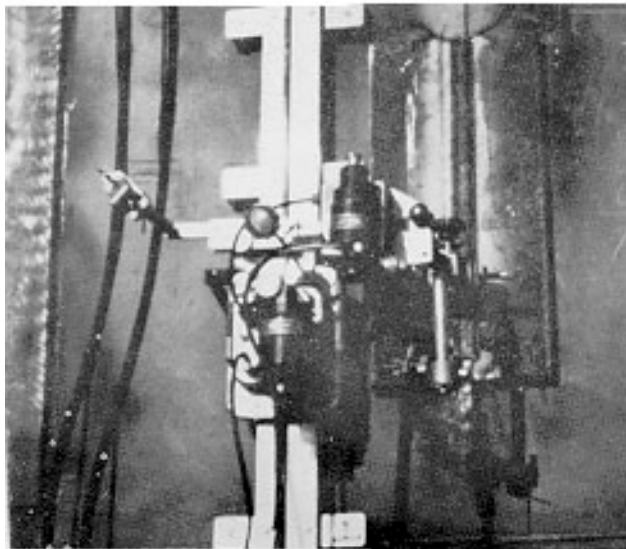
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**Application:** Field assembly of dragline.

**Process:** Flux cored arc welding.

**Equipment:** Bug-O Weaving Kit.

**Savings:** 712 man hours plus uniform improved weld quality.



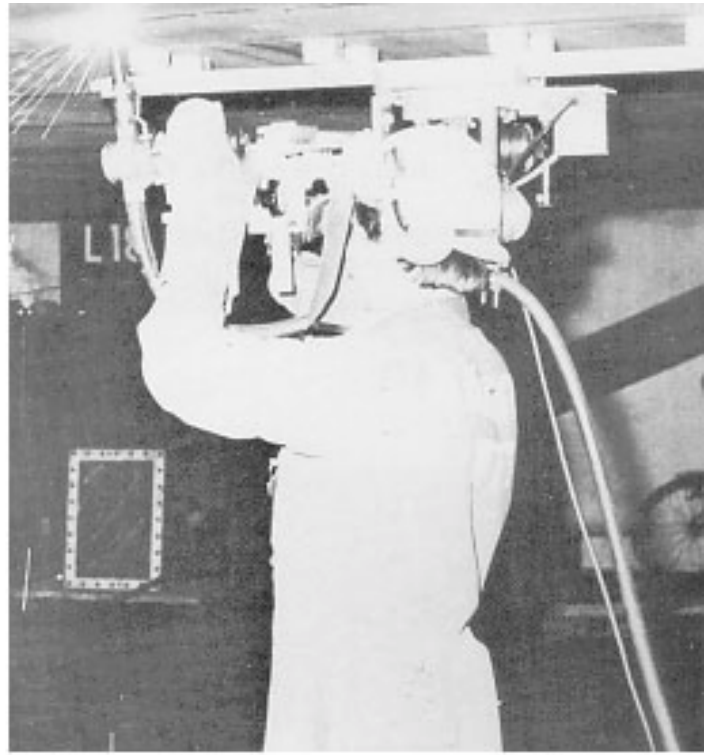
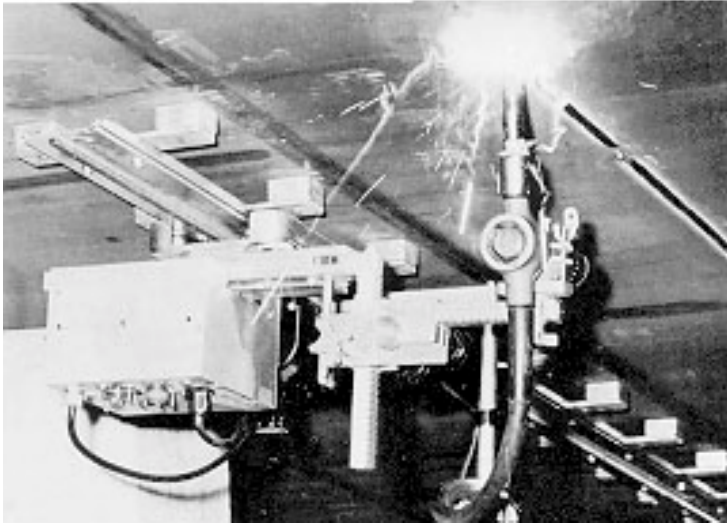


**Application:** Overhead welding on ships.

**Process:** Flux cored arc welding.

**Equipment:** Bug-O Speed Weaving Kit.

**Savings:** Welding time reduced 50% with better quality and uniform welds.



**Application:** Shipbuilding, vertical welds.

**Process:** Flux cored arc welding.

**Equipment:** Bug-O Speed Weaving Kit.

**Savings:** \$87,782.00 per year.







# Applications

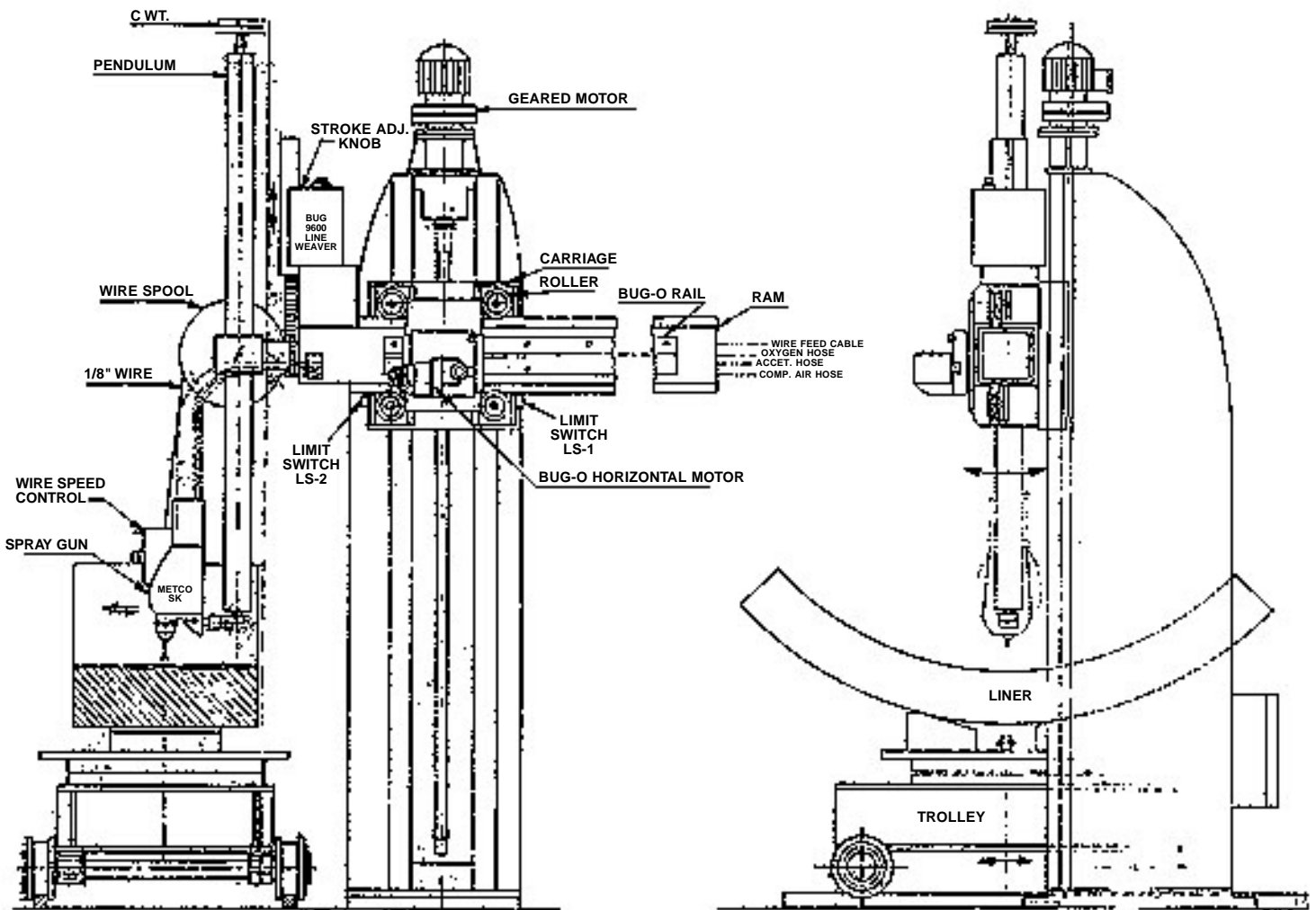
## Overlay, Hardfacing, Metalizing

**Application:** Overlaying bearing liners on cement kilns.

**Process:** Metco spraying.

**Equipment:** Bug-O Weaving Kit and accessories mounted on our customer's fixture.

**Savings:** 35-40% reduction in machining time and 2000-2500 man hours per year.

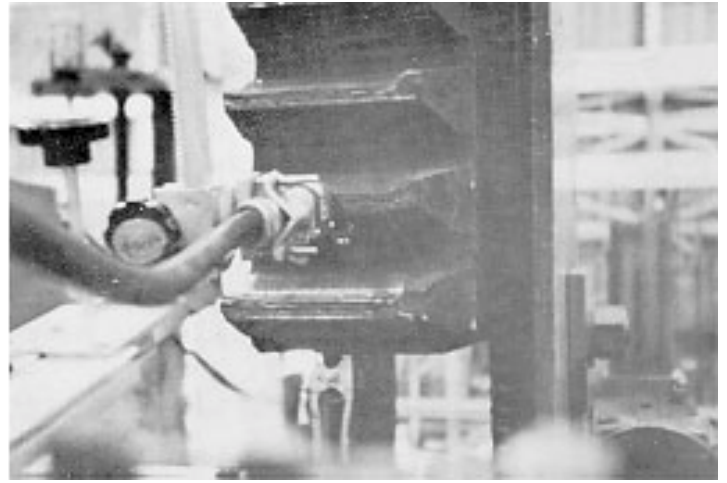
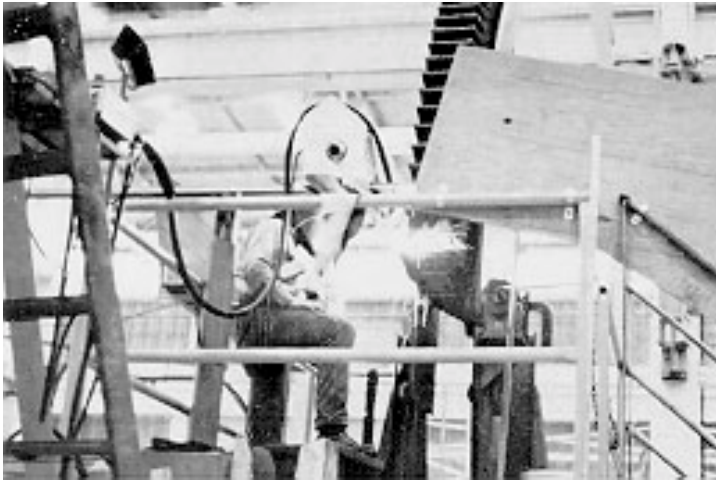


**Application:** Repair of drag line gears.

**Process:** MIG welding.

**Equipment:** BUG-O-VERLAY

**Savings:** Salvaging worn gears saved \$195,000.00



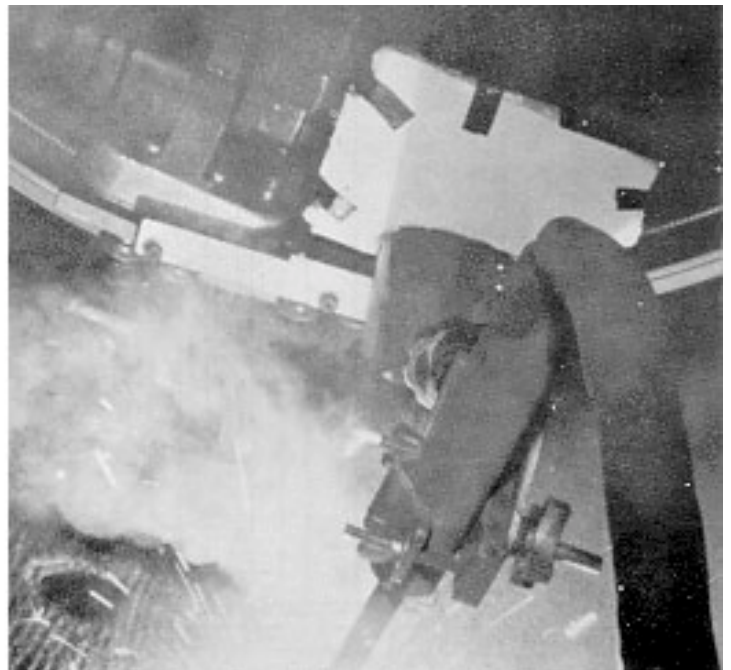
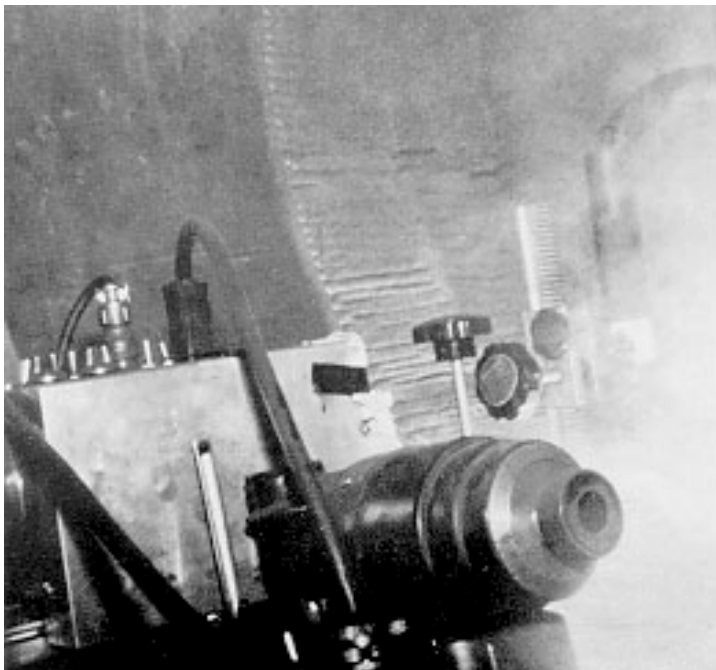
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**Application:** Overlaying 44" (1120 mm) cylindrical mixing vessels.

**Process:** Flux cored arc welding.

**Equipment:** Bug-O ROL-O Carriage, Bent Rail and Weaver with Pendant Controls, turning rolls supplied by customer.

**Savings:** 75% reduction in labor cost and substantial savings of material plus uniform, thickness and appearance.

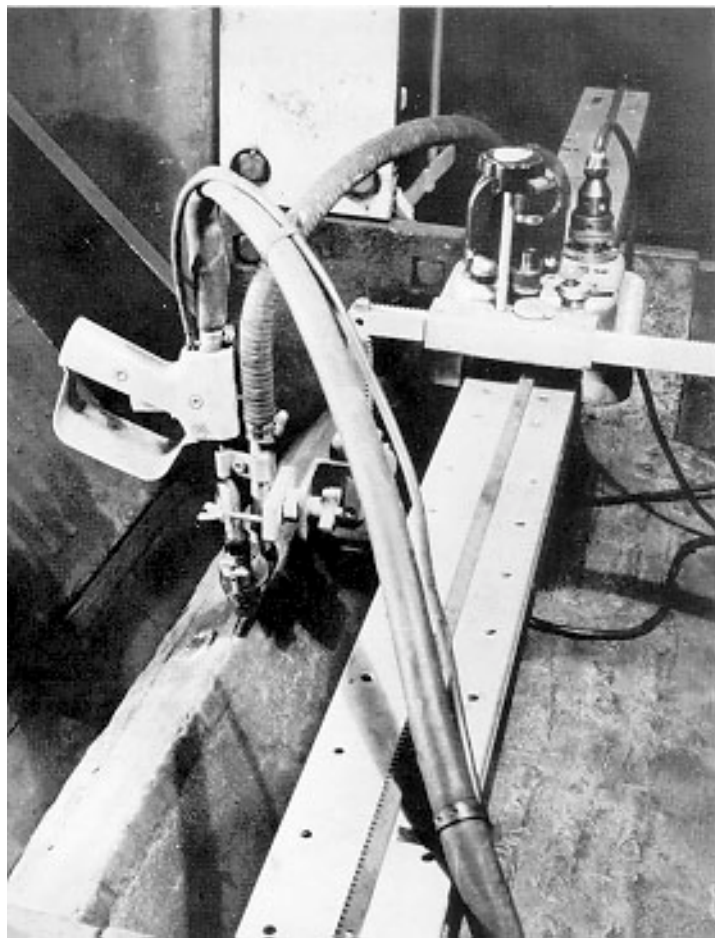
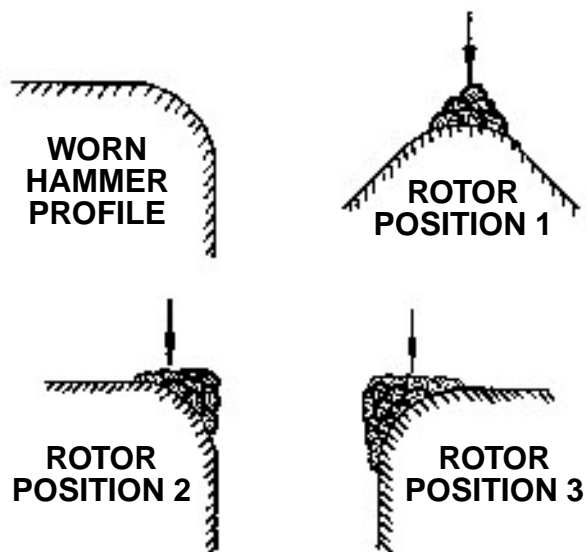


**Application:** Rebuilding crusher rotors.

**Process:** Flux cored arc welding.

**Equipment:** Bug-O General Welding Kit with Pendant Control.

**Savings:** 150% increase in productivity and improved working conditions.

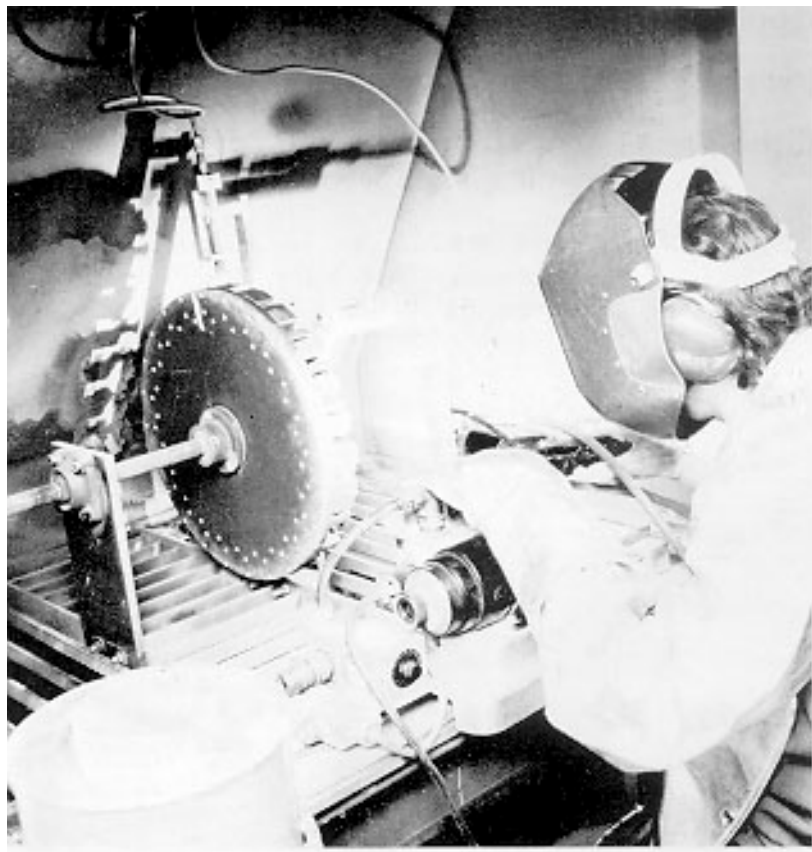


**Application:** Deposit of wear resistant coatings.

**Process:** Plasma spraying.

**Equipment:** Bug-O DC Cyclor on DC III, IV with auxiliary relay and rail.

**Savings:** Uniform coatings with excellent wear characteristics.



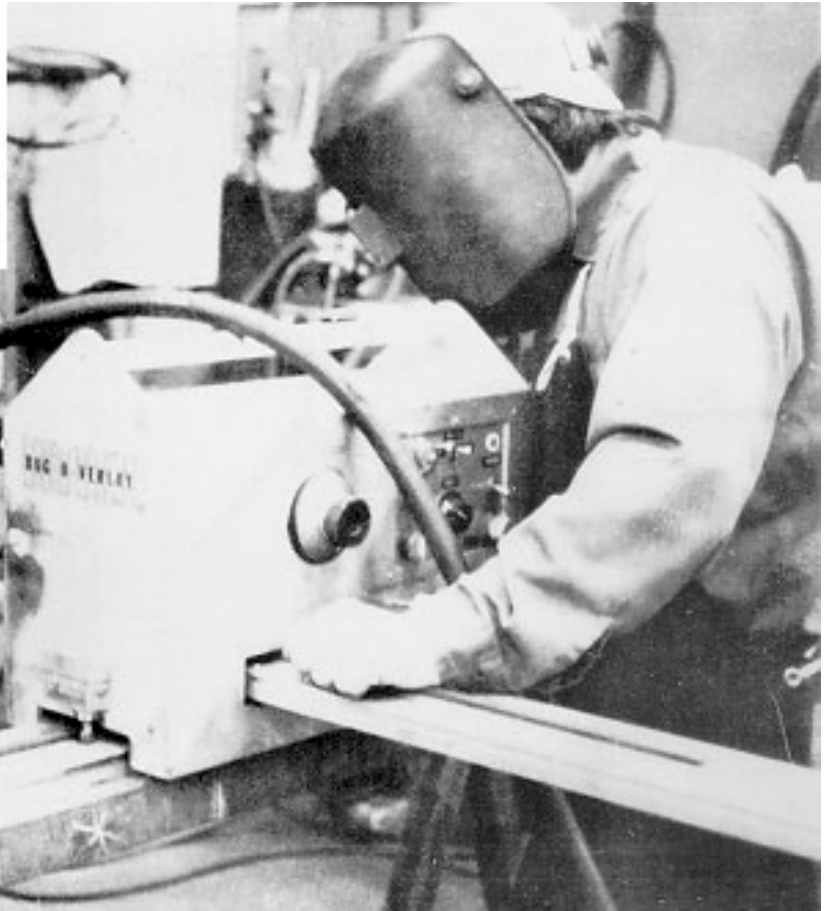


**Application:** Overlaying parts of scrubber units used in primary metals and foundry production.

**Process:** MIG welding.

**Equipment:** BUG-O-VERLAY

**Savings:** \$8,090.00 on four jobs.

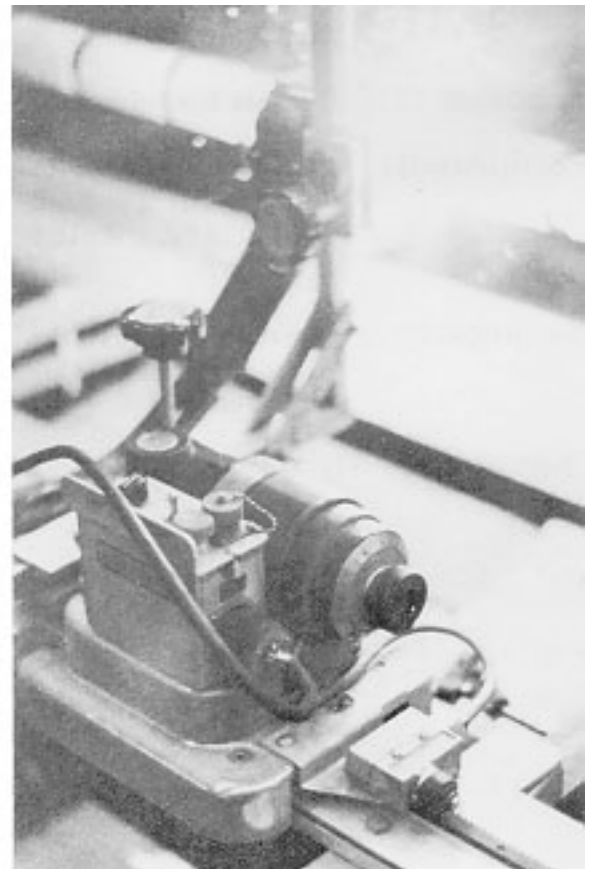


**Application:** Hardfacing percussion drilling pistons.

**Process:** Plasma spraying.

**Equipment:** Bug-O DC Cycler on DC III, IV, lathe and fixture supplied by customer.

**Savings:** 50% reduction in man hours, 40% reduction in powder, 20% reduction in grinding time, uniform deposition;  $\pm .002"$  (.05 mm)



**Application:** Develop a welding station to demonstrate the welding process and provide samples for testing.

**Process:** MIG welding.

**Equipment:** Bug-O General Welding Kit.

**Savings:** Effective, economical work station.



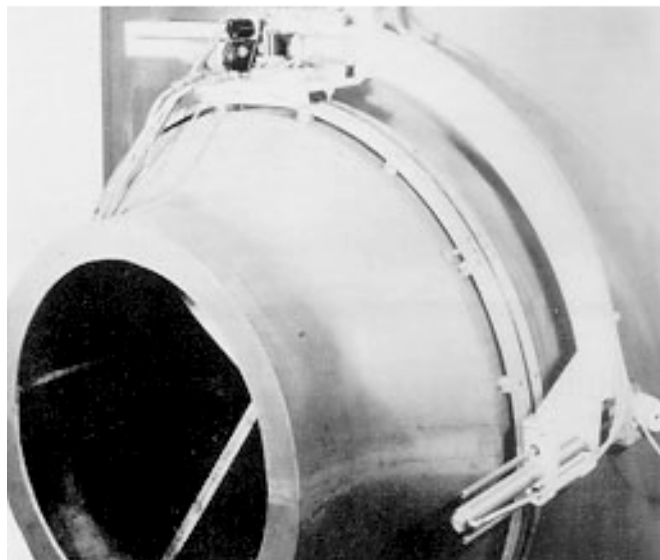
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**Application:** Build an inspection device for nozzle-to-shell weld in a reactor vessel.

**Process:** Ultrasonic inspection.

**Equipment:** Bug-O Bent Rail, with special carriage, drives and fixture made by customer.

**Savings:** Enabled inspection without shutting down the reactor.



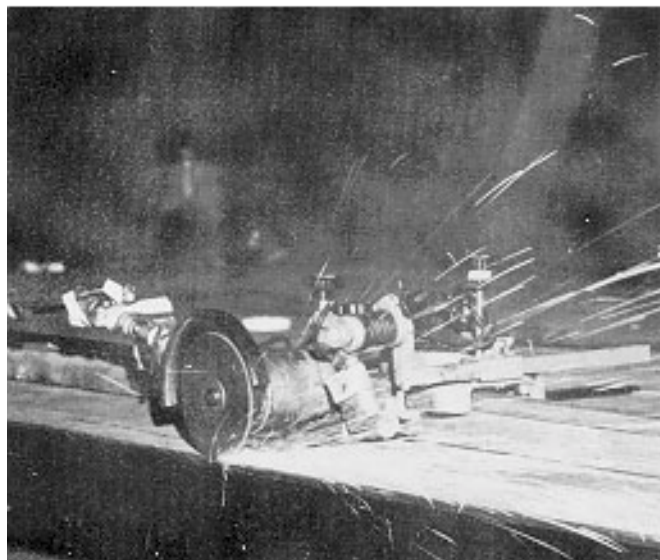
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**Application:** Removal of cladding adjacent to weld.

**Process:** Grinding.

**Equipment:** Bug-O DC III, Panograph, Rail and Magnets.

**Savings:** 50% less time required to prepare surface.



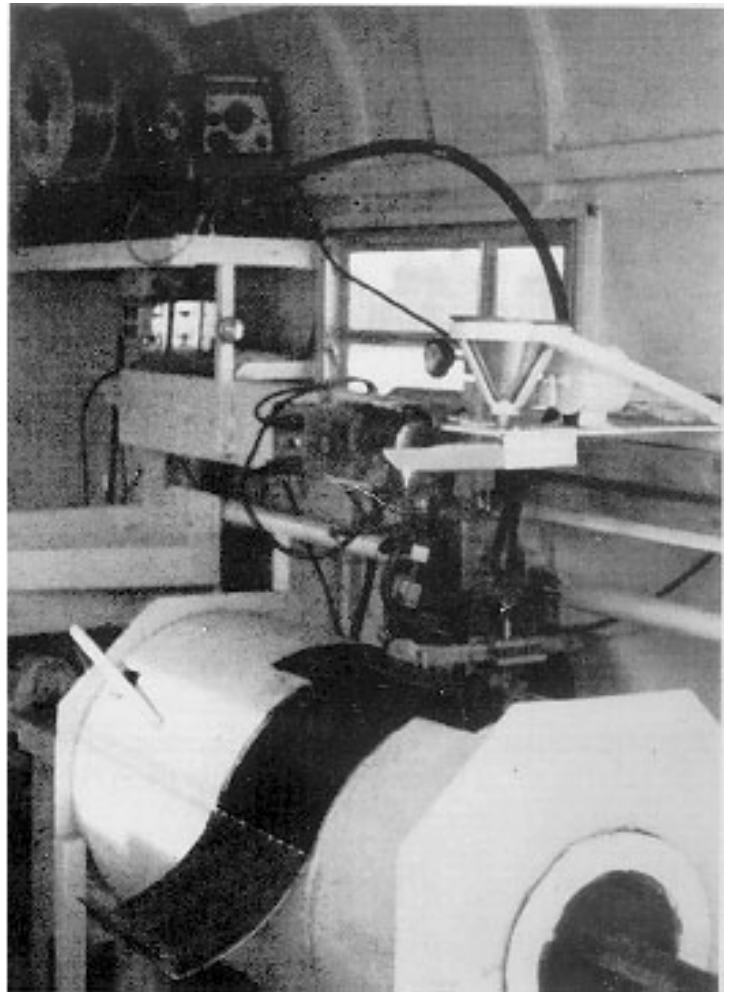


**Application:** Hardfacing drill pipe joints.

**Process:** Flux cored arc welding.

**Equipment:** Bug-O Weld Weaving Kit and Stepping Module, fixture supplied by customer.

**Savings:** \$75,000.00 per year per drill rig.

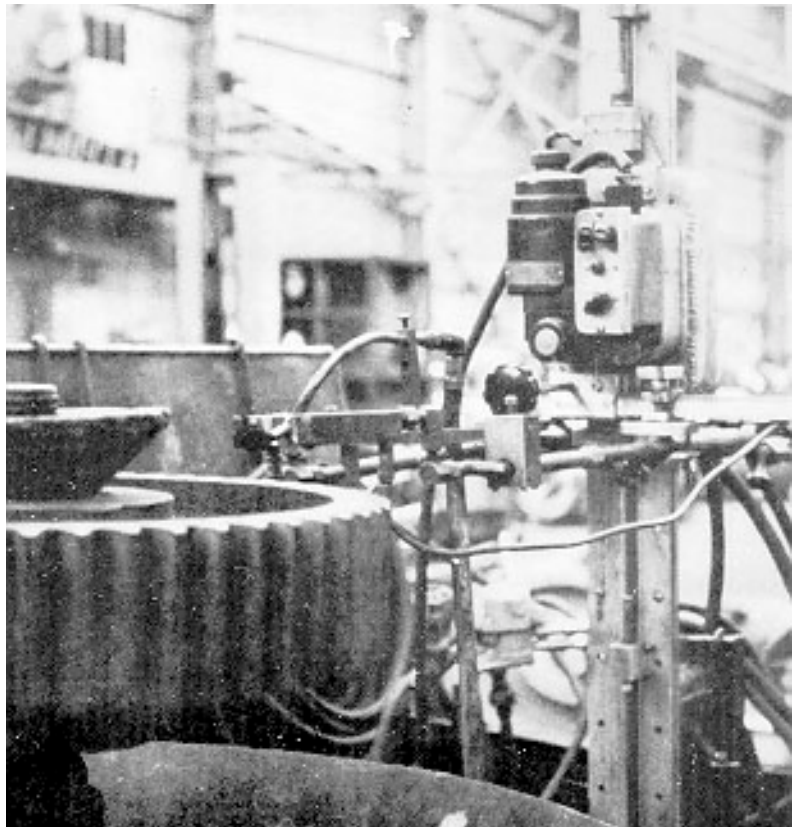


**Application:** Flame hardening gear teeth.

**Process:** Oxyfuel.

**Equipment:** Bug-O DC Cyclor on DC III, IV, fixture made by customer.

**Savings:** Improved quality and production without maintenance problems.







# Applications

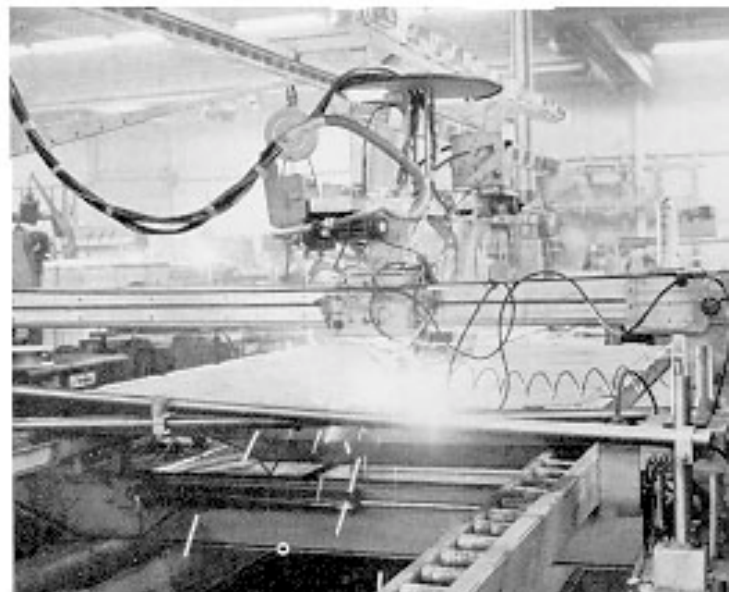
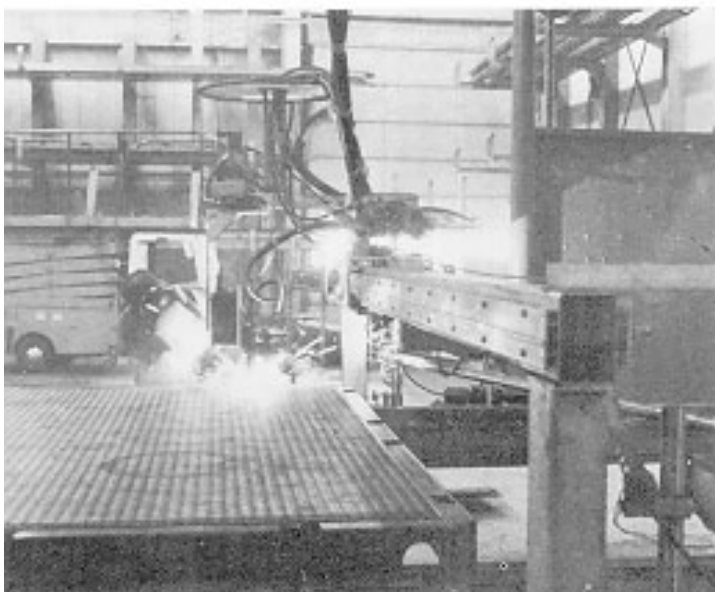
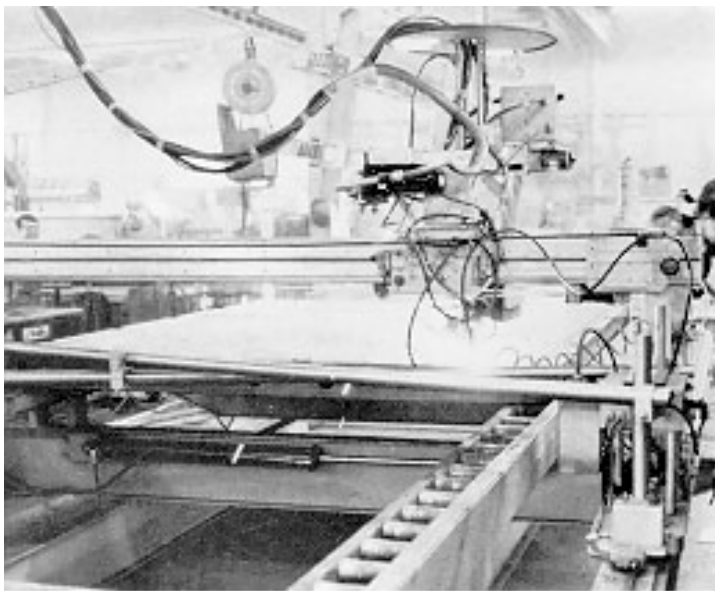
## Fixturing for Welding

**Application:** Mechanized fillet welding.

**Process:** MIG welding.

**Equipment:** MUG-O Welding Gantry with special controls supplied by customer.

**Savings:** Improved quality and appearance in 1/10 the time required for manual welding.

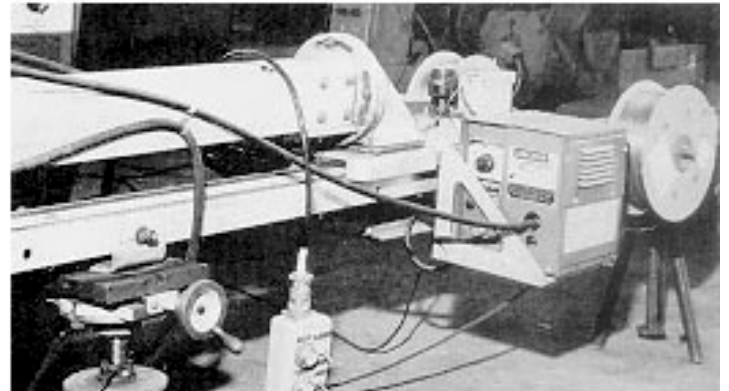
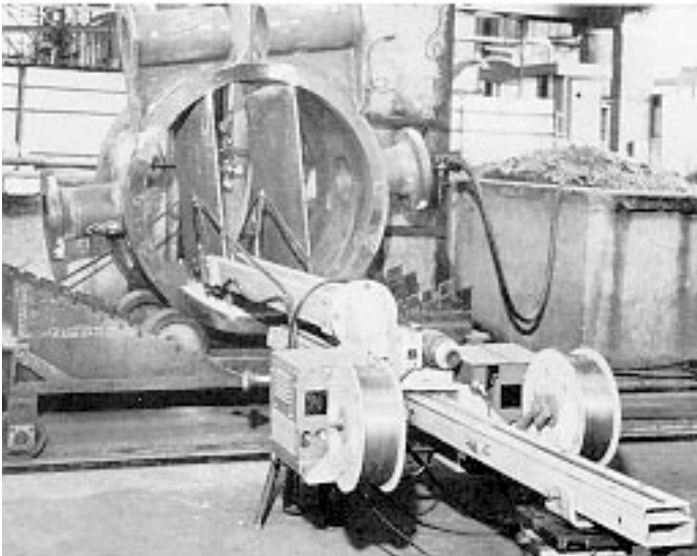
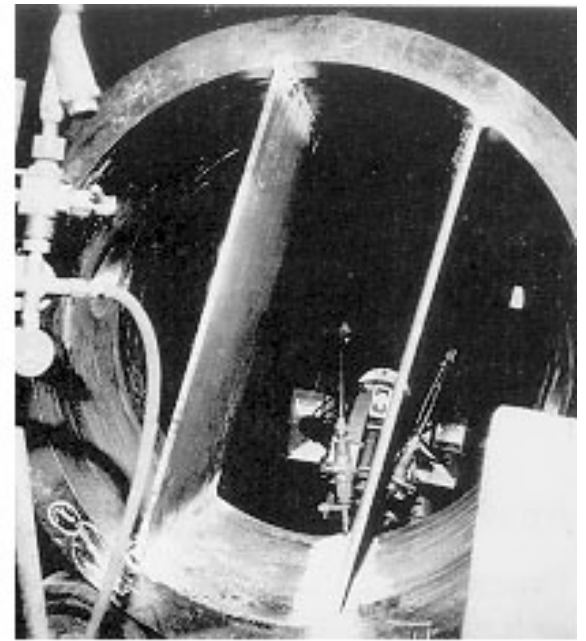


**Application:** Mechanized simultaneous fillet welding.

**Process:** Dual flux cored arc welding.

**Equipment:** Bug-O DC IV, Carriage, Rail and fixturing made by customer.

**Savings:** Eliminated distortion and provided annual savings of \$6,000.00.



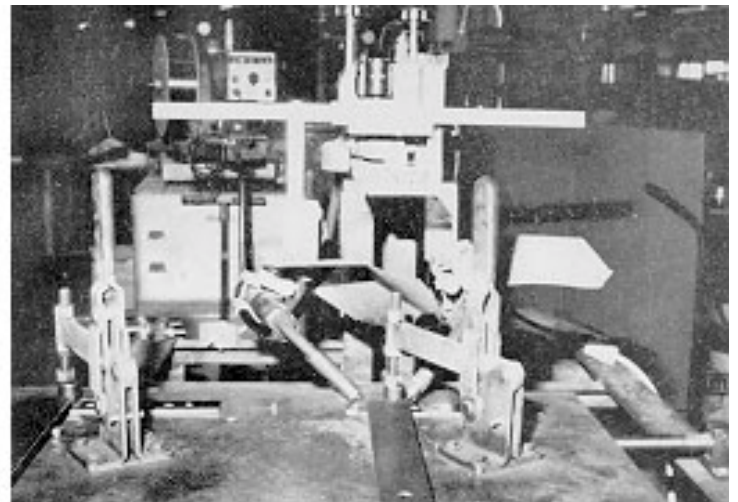
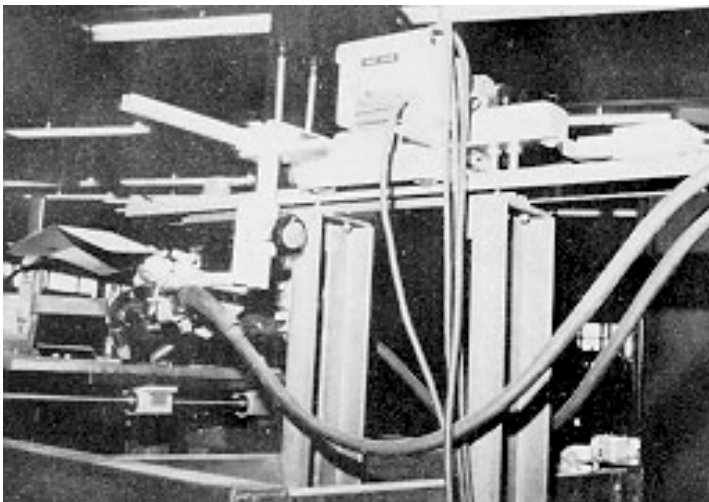
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**Application:** Welding stamped parts to plate.

**Process:** Dual MIG welding.

**Equipment:** Bug-O DC Skip Welding Kit on customer's fixture.

**Savings:** Production increased 85%, work handling was reduced and skill level reduced.



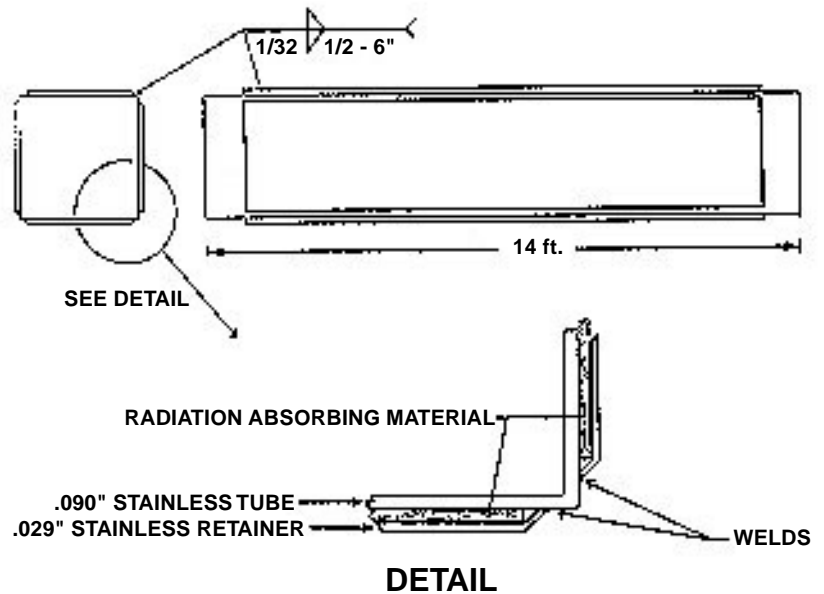


**Application:** Intermittent welding of stainless steel strip to stainless box section.

**Process:** Dual flux cored arc welding.

**Equipment:** Bug-O DC Skip Welder mounted on customer's fixture.

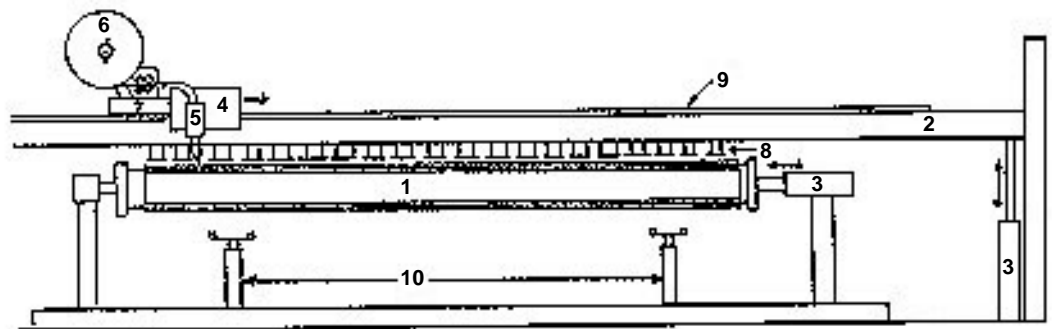
**Savings:** Weld defects reduced from 10-12% to 2-3%, distortion eliminated, one operator instead of three.



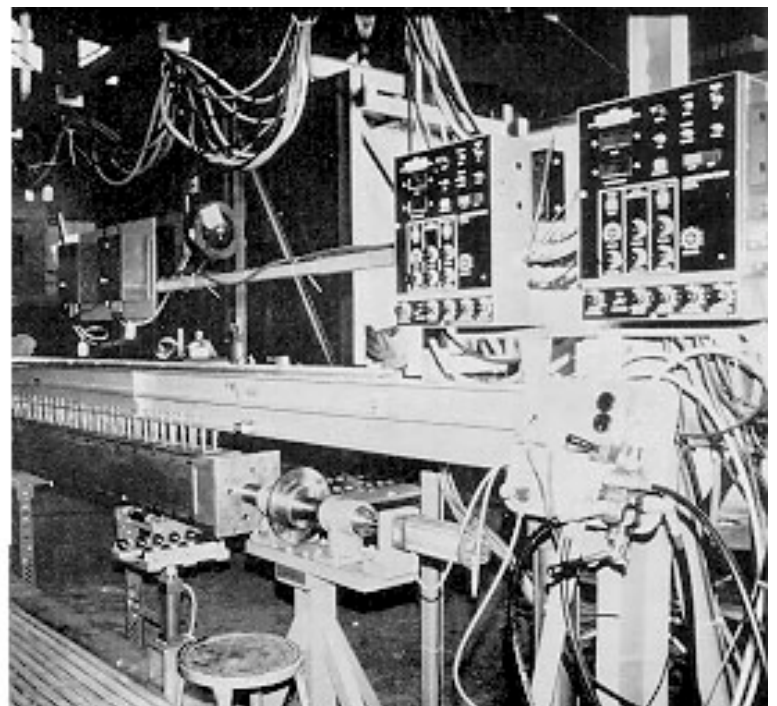
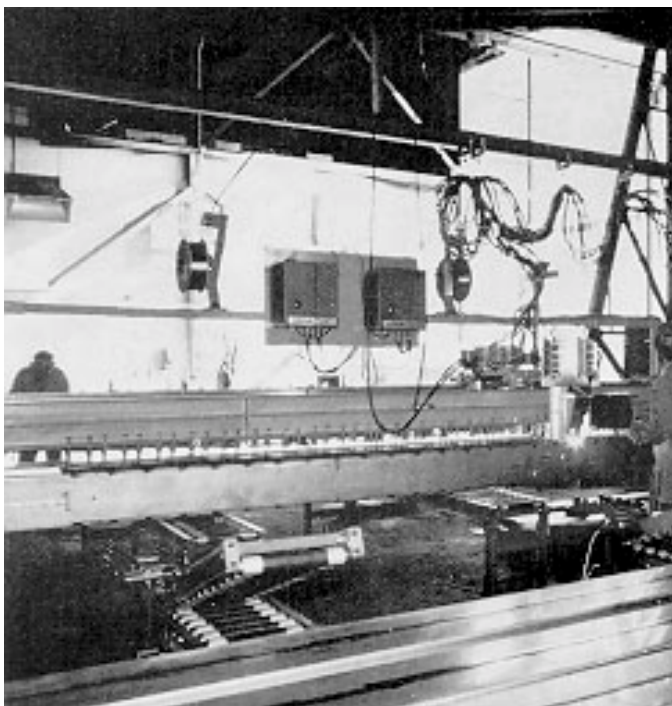
**EXHIBIT NUMBER 1**

**BASIC FIXTURE LAYOUT**

1. TUBE
2. HYDRAULIC MOUNTED BOOM
3. HYDRAULIC TUBES
4. BUG-O TRACTOR
5. MIG GUN
6. SPOOLED WIRE
7. CARRIAGE
8. SPRING LOADED HOLD DOWN CLAMPS
9. BUG-O TRACK
10. PNEUMATIC LIFTS



**EXHIBIT NUMBER 2**



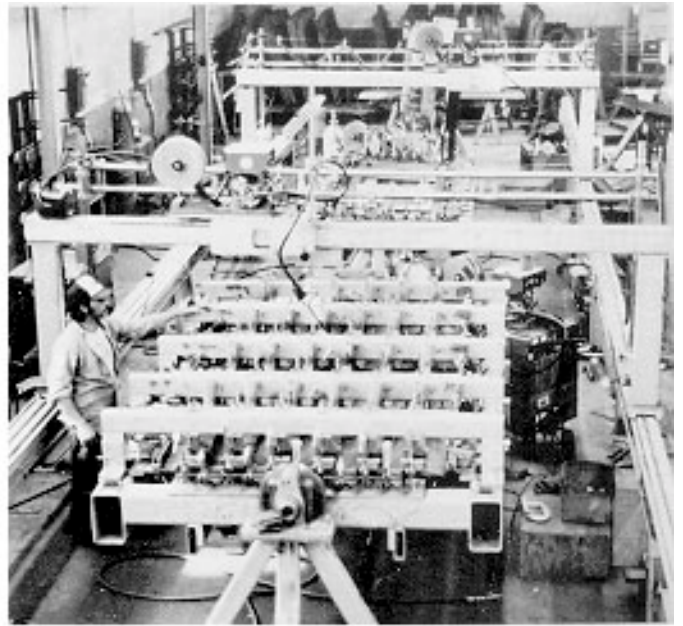


**Application:** Fabricate weldment from 50 separate pieces.

**Process:** MIG welding.

**Equipment:** Two MUG-O Welding Gantries.

**Savings:** Minimum distortion, good control of tight tolerances with reduced material handling, produced substantial savings.



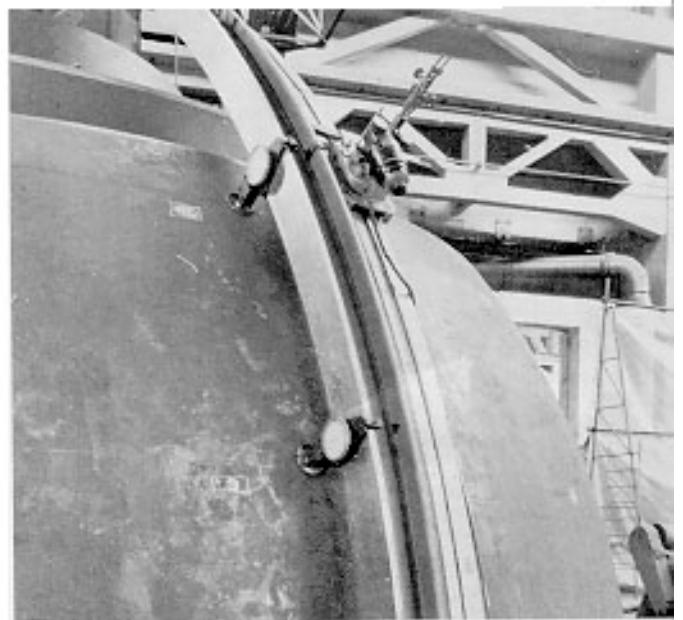
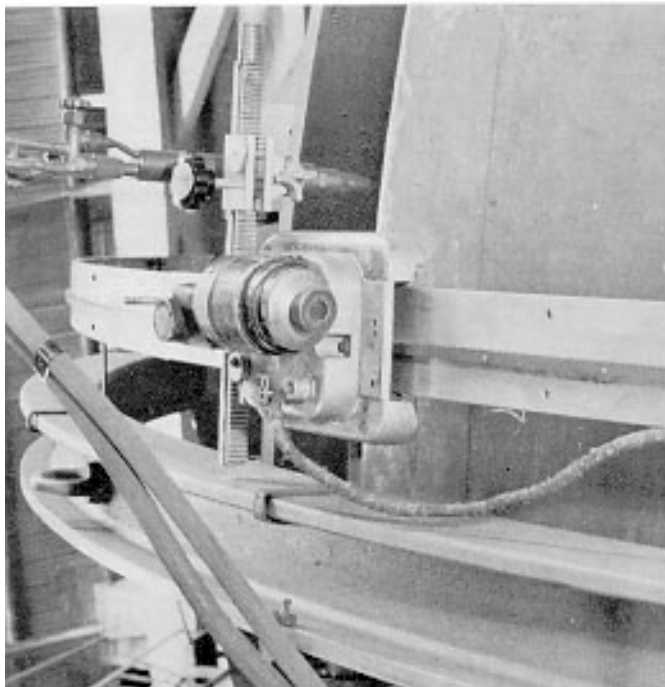
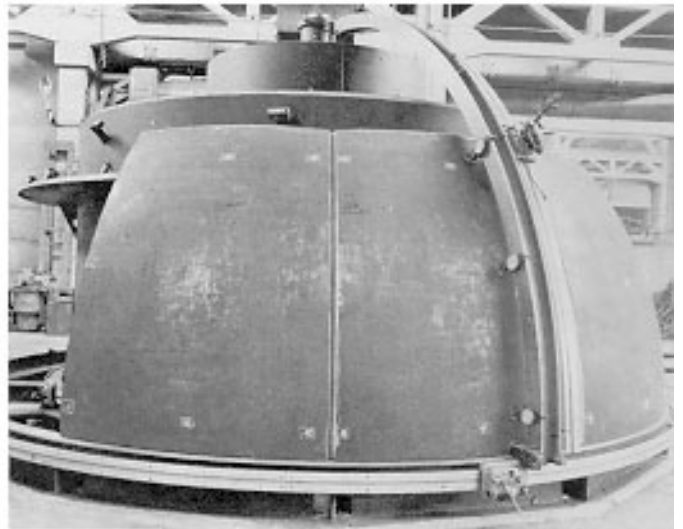
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**Application:** Fabrication of submarine sections.

**Process:** MIG welding.

**Equipment:** BUG-O DC III and IV, Bent Rail mounted on customer's fixture.

**Savings:** Doubled production and improved product quality.

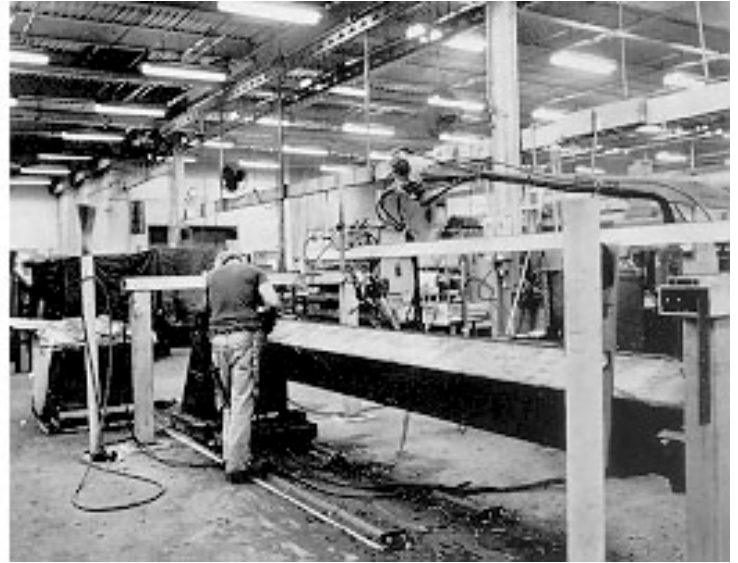
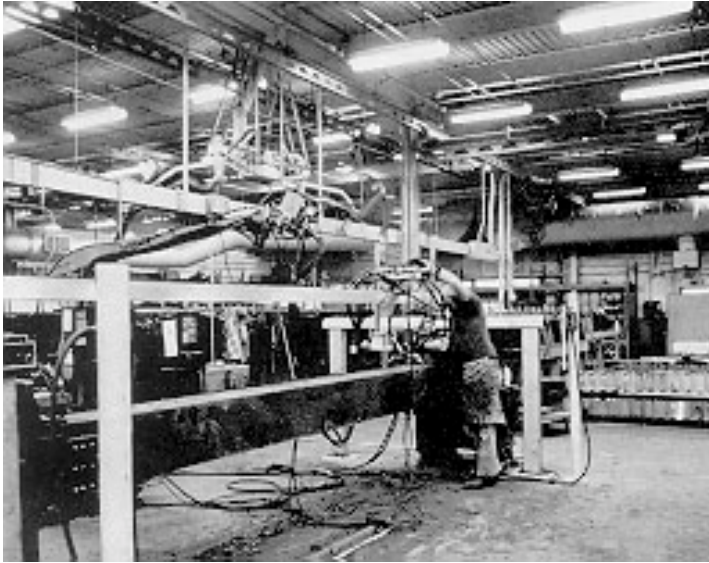


**Application:** Fabricating telescoping boom segments for large digging machines.

**Process:** Dual MIG welding.

**Equipment:** Bug-O DC Skip Welder, Rails, Carriages and other components mounted on fixture made by customer.

**Savings:** Distortion eliminated, close tolerances maintained and productivity increased 200%.



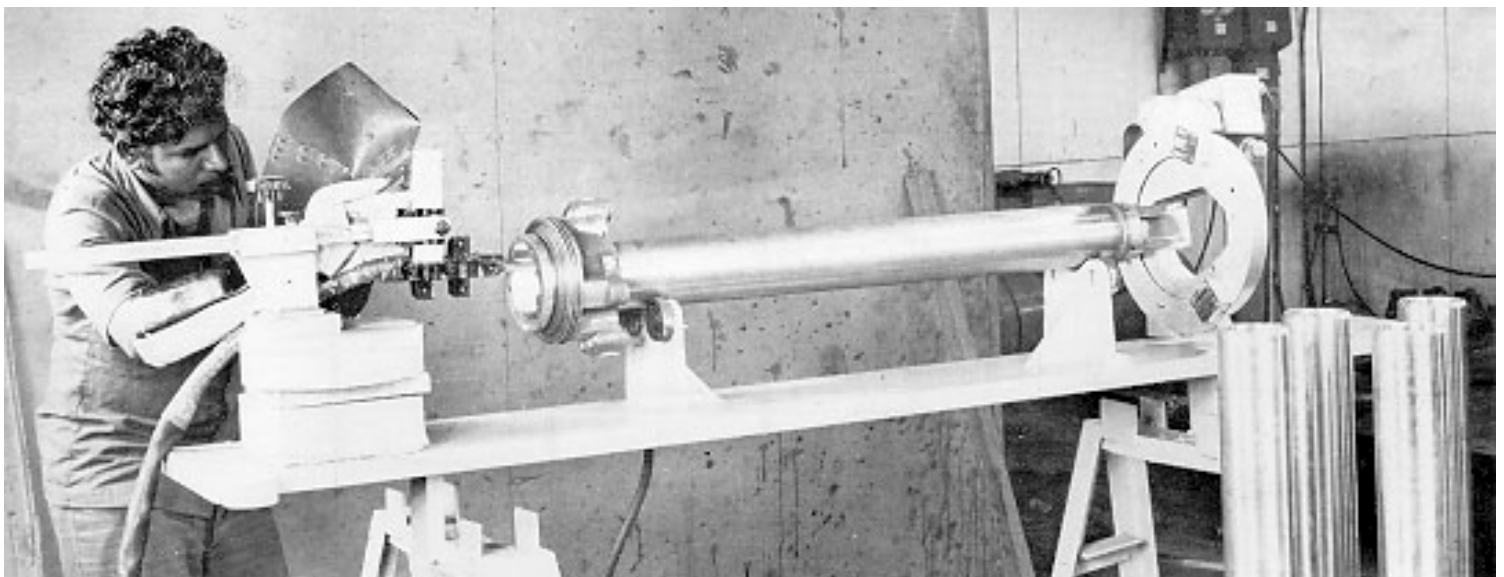
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**Application:** Rotary welding of cylindrical heads.

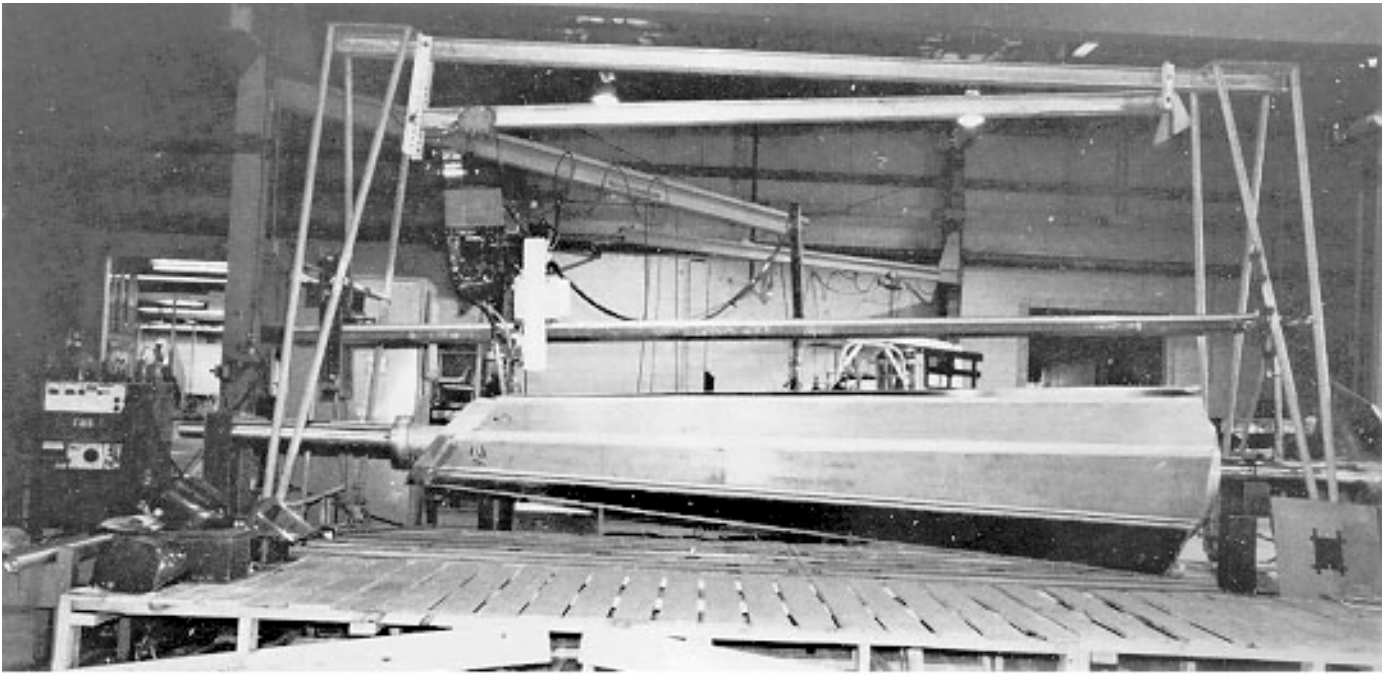
**Process:** TIG welding.

**Equipment:** HOB-O, disassembled and fitted on customer's fixture.

**Savings:** Negligible distortion without defects, production increase saved \$24.00 per piece.







**Application:** Welding 8-sided truncated mandrel made of 1" (25 mm) aluminum.

**Process:** MIG welding.

**Equipment:** Bug-O Beam Bug and rail on customer's fixture.

**Savings:** 32% reduction in welding time with accurate dimensions.

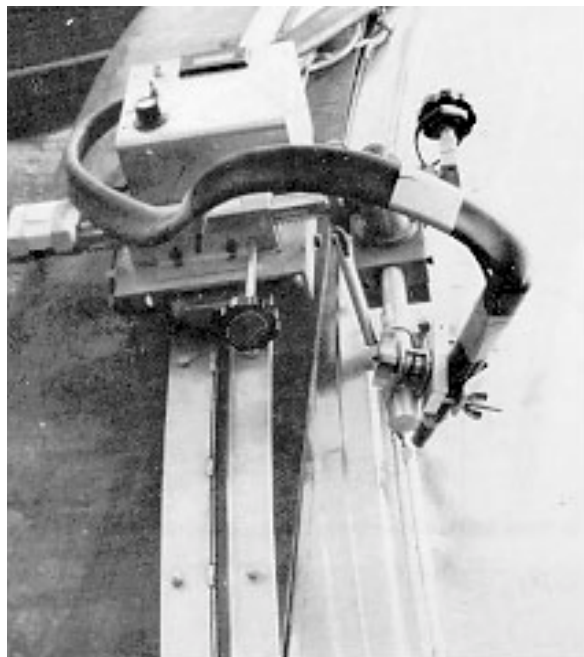


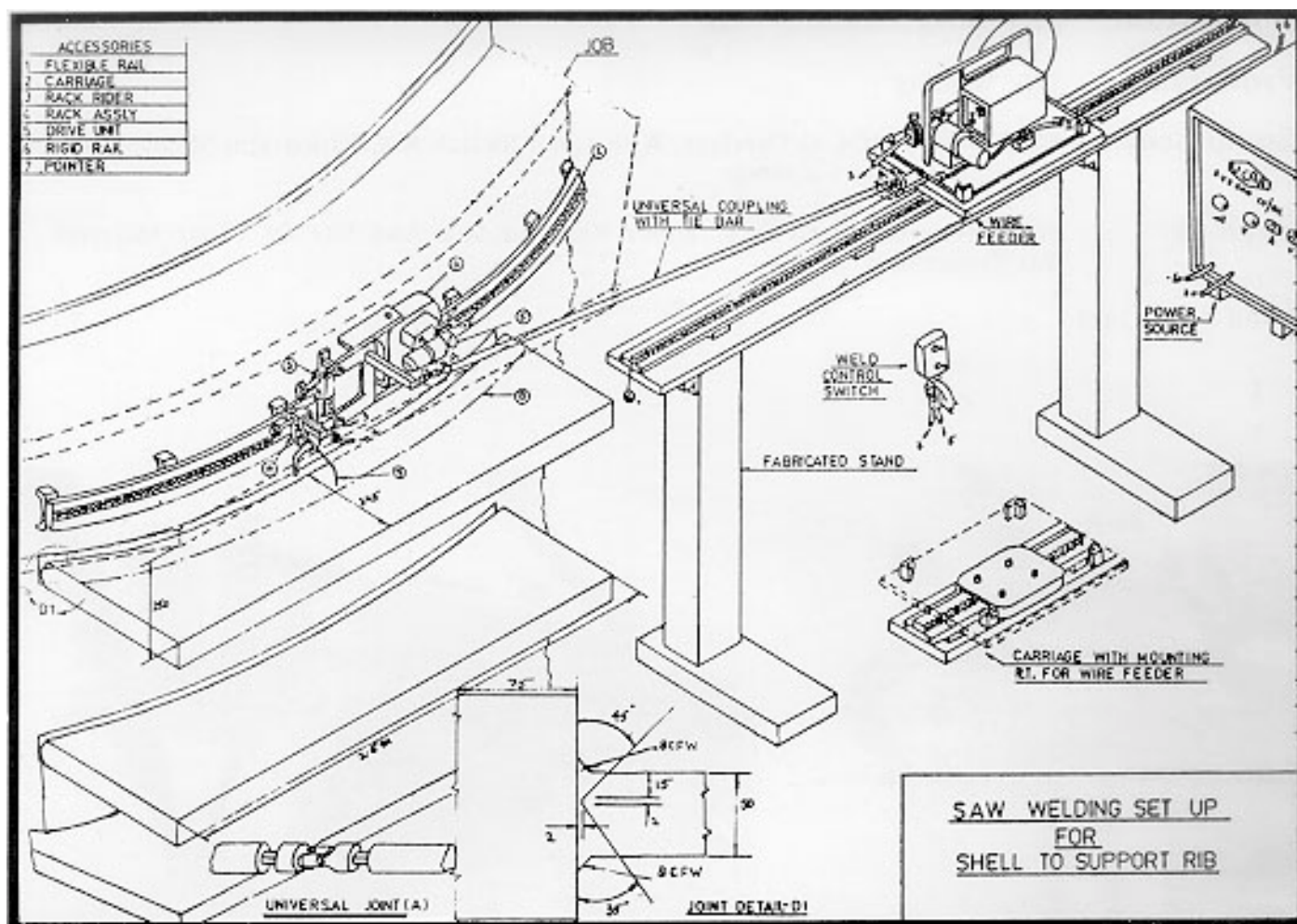
**Application:** Fabricating aluminum boats.

**Process:** TIG welding.

**Equipment:** Bug-O DCD ROL-O Carriage, with limit switch kit, panograph mounted on fixture made by customer.

**Savings:** Production increased 60%, labor reduced 50% and use of filler material was eliminated.





**Application:** Welding support plates to large weldment with limited access.

**Process:** Sub Arc welding.

**Equipment:** Bug-O DCD ROL-O Carriage, trailer, rails and fittings mounted on customer's fixture.

**Savings:** 150 man-hours per joint or 1500 man-hours for the complete project.





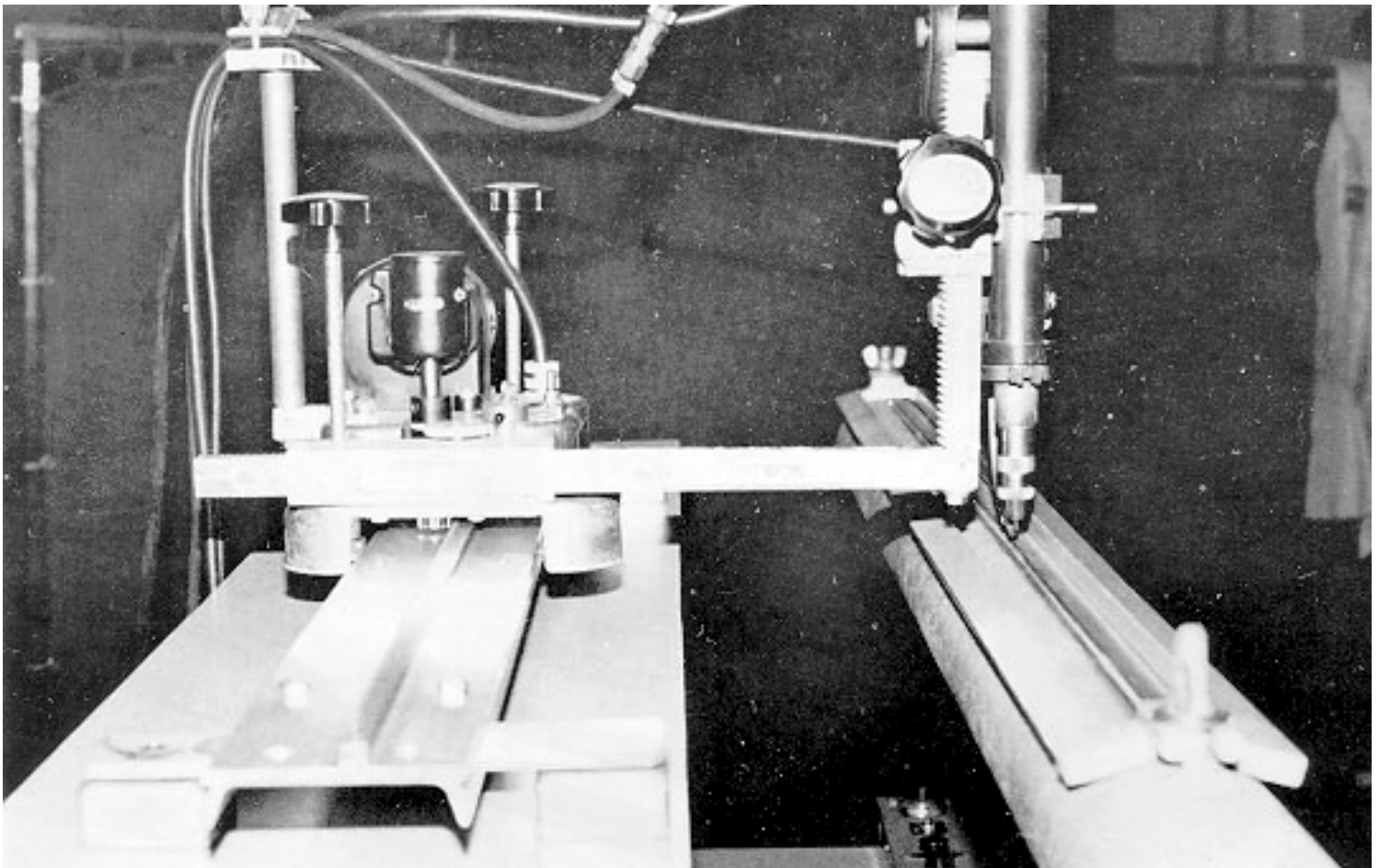


**Application:** Seam welding.

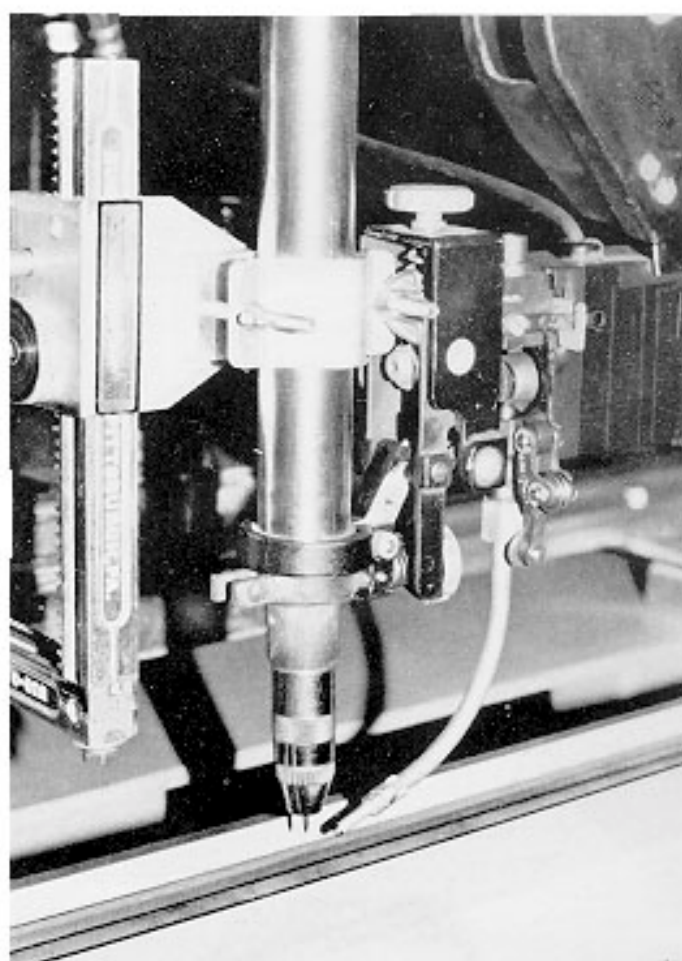
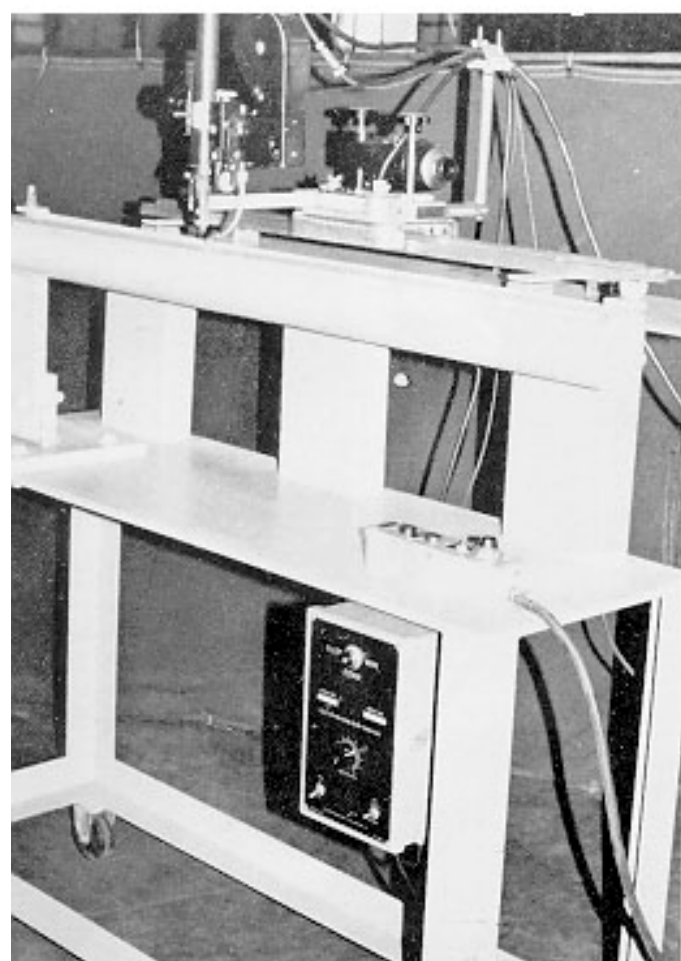
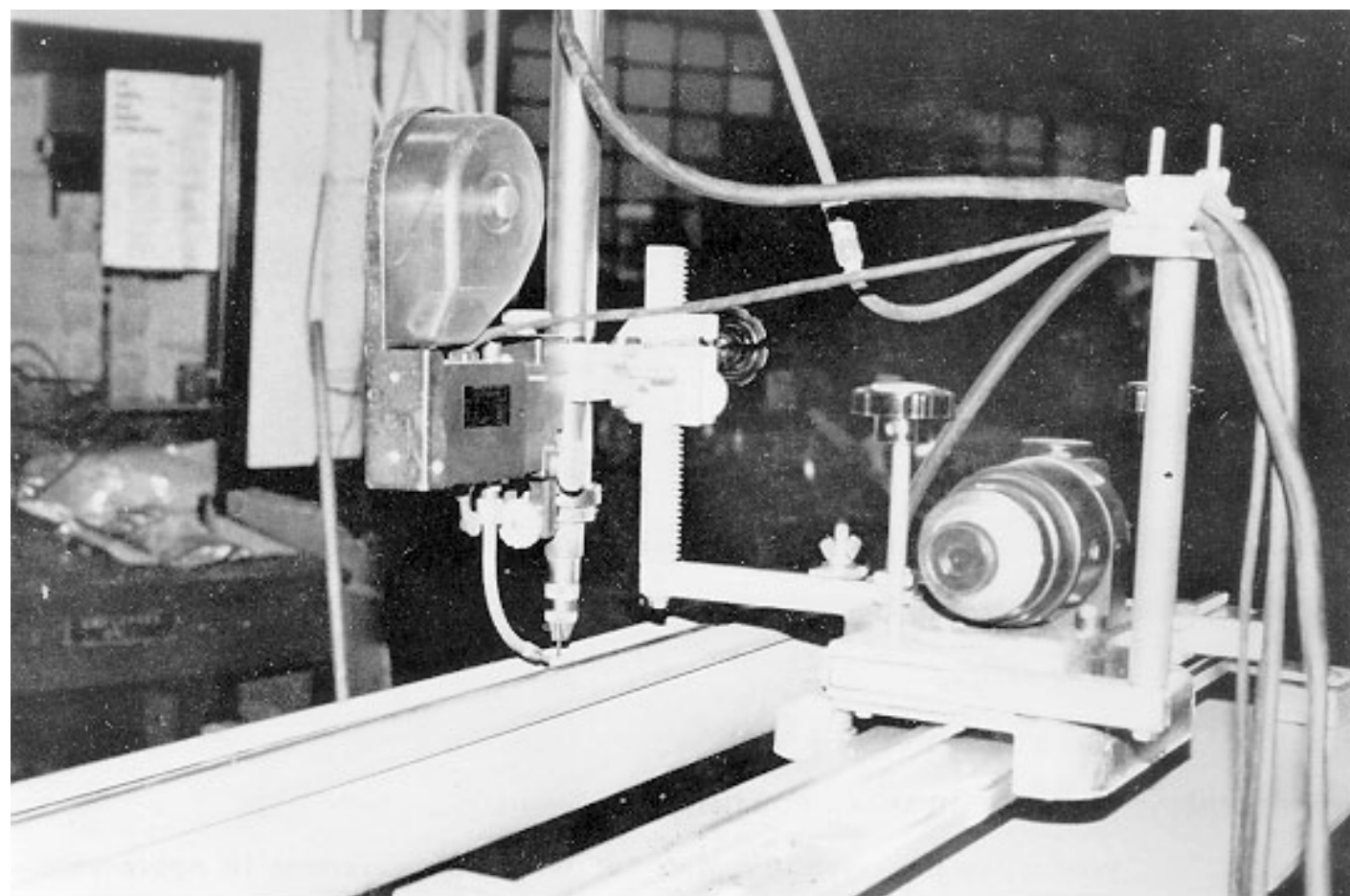
**Process:** Cold Wire TIG Welding.

**Equipment:** Bug-O DC-III mounted on customer's fixture.

**Savings:** Production increased 25% with substantial improvement in appearance, penetration and quality.





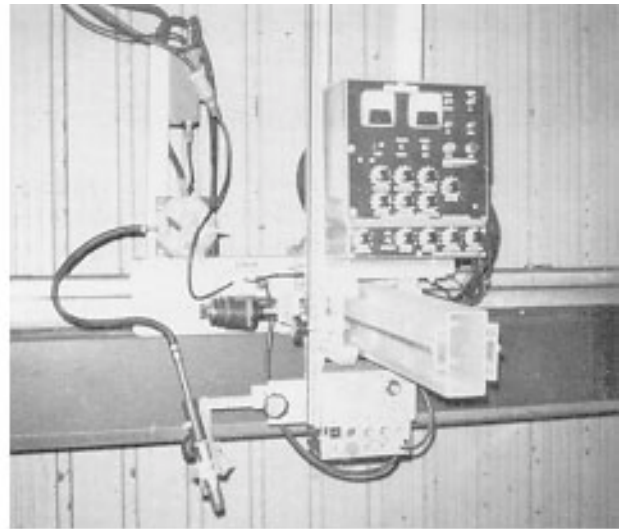


**Application:** Manufacture of pressure vessels.

**Process:** MIG Welding.

**Equipment:** Bug-O Yoke Carriage, Drive Unit, Speed Weaver, Vertifloat Carriages, Rails and Supports mounted on fixture built by customer.

**Savings:** Productivity increased more than 100% with great improvement in appearance and quality.



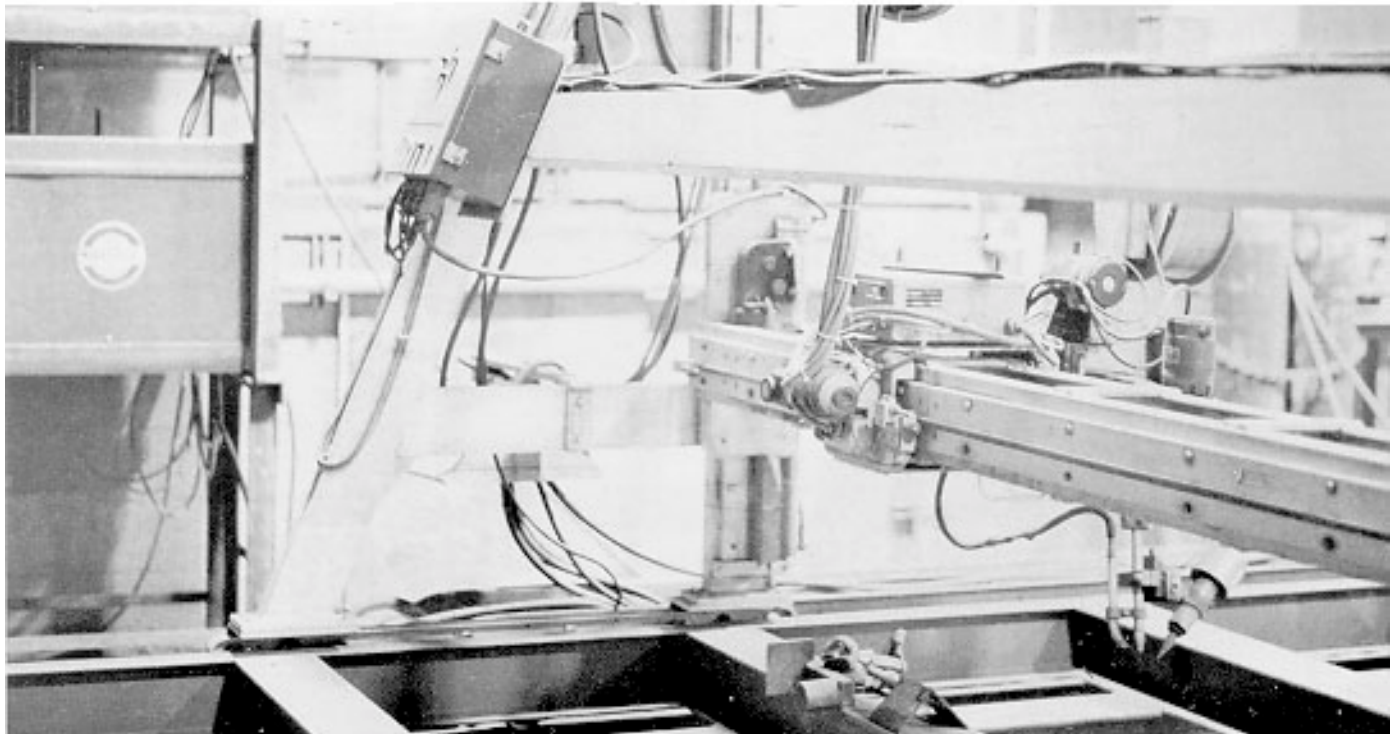
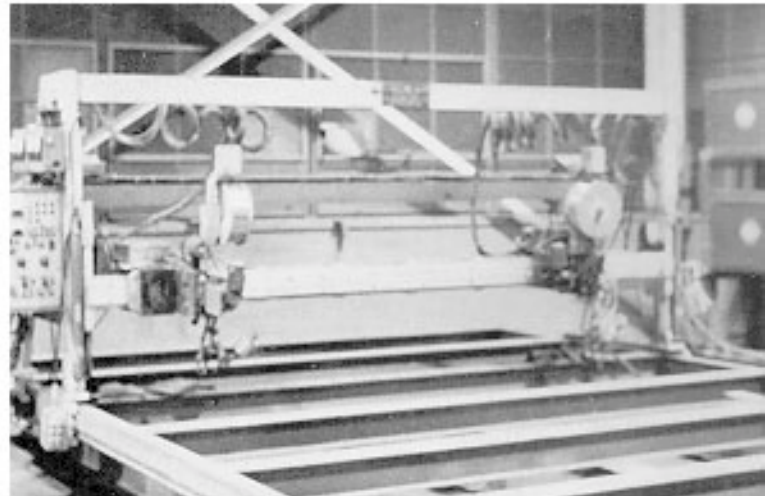
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**Application:** Panel fabrication.

**Process:** Dual MIG Welding.

**Equipment:** MUG-O Welding Gantry mounted on customer's fixture.

**Savings:** Increased production and improved quality.



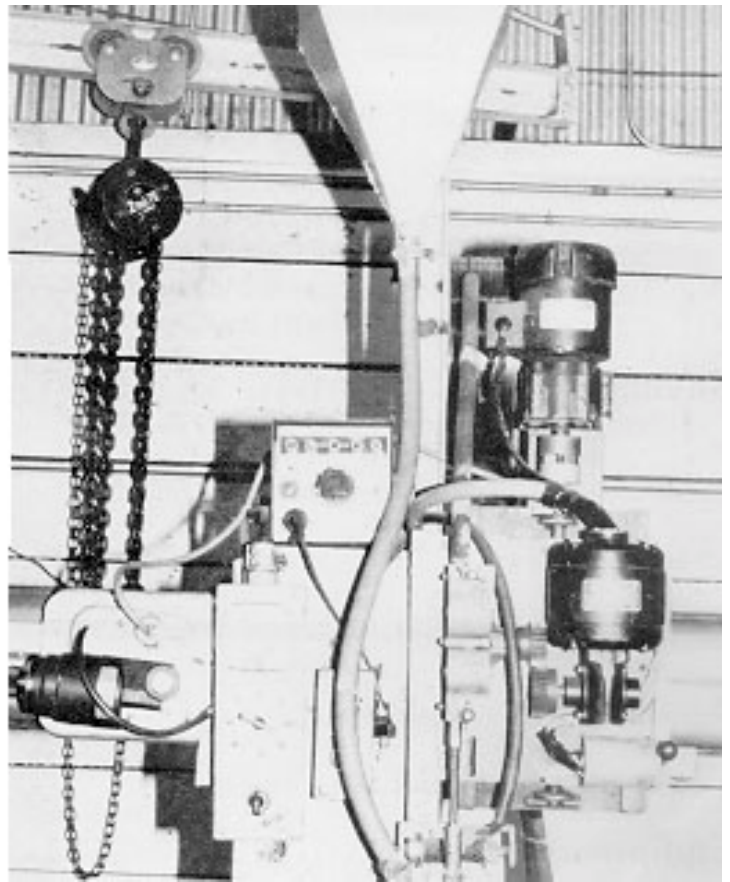
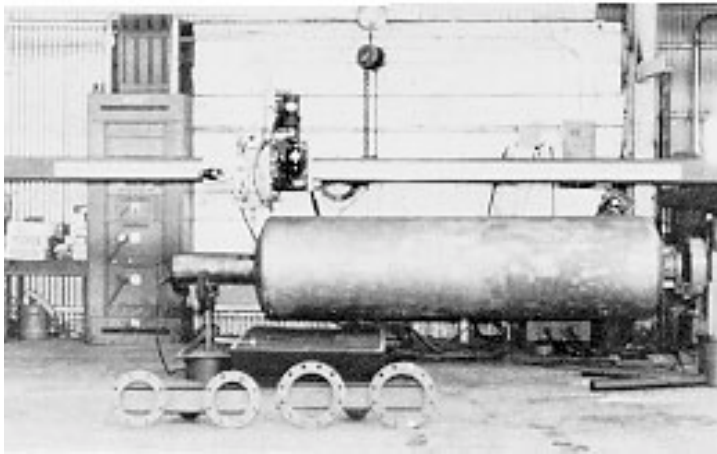


**Application:** Fabricating industrial mufflers.

**Process:** Sub Arc Welding.

**Equipment:** Bug-O Yoke Carriage and Drive Unit mounted on customer's fixture.

**Savings:** Production increased 40%.



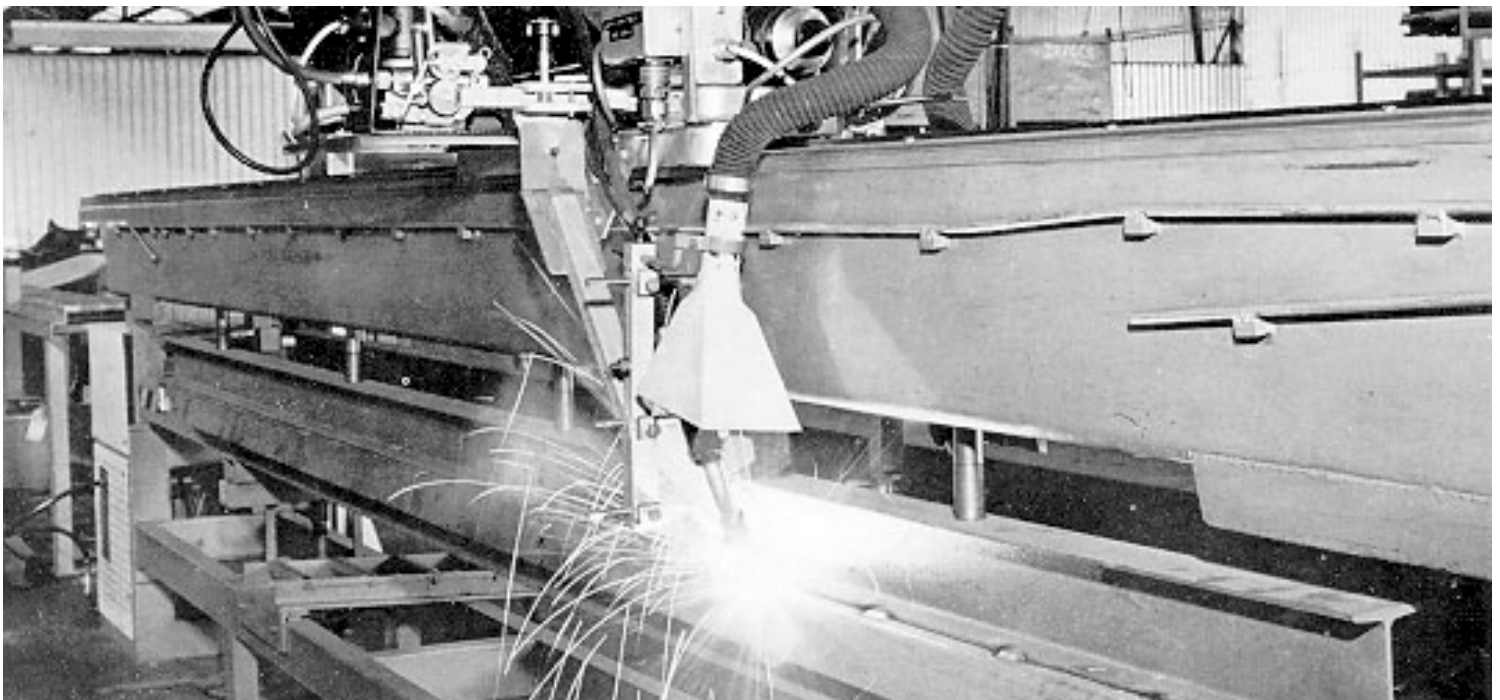
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**Application:** Welding of Hydraulic Lift Platform Components.

**Process:** Flux Cored Arc Welding.

**Equipment:** Bug-O DC IV, Trailer mounted on fixture built by customer.

**Savings:** Production time reduced with 50% savings in manpower, without distortion.

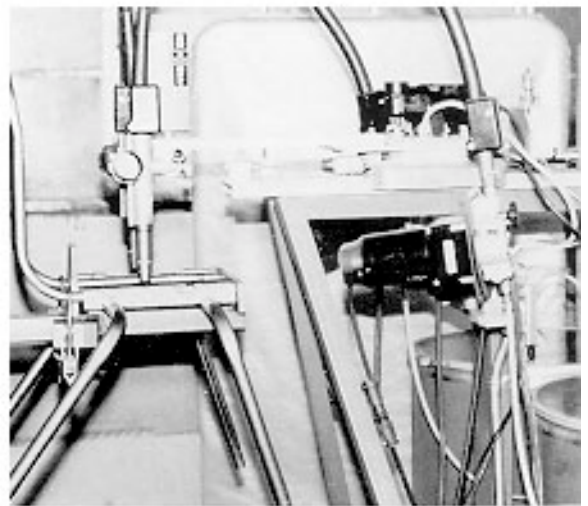
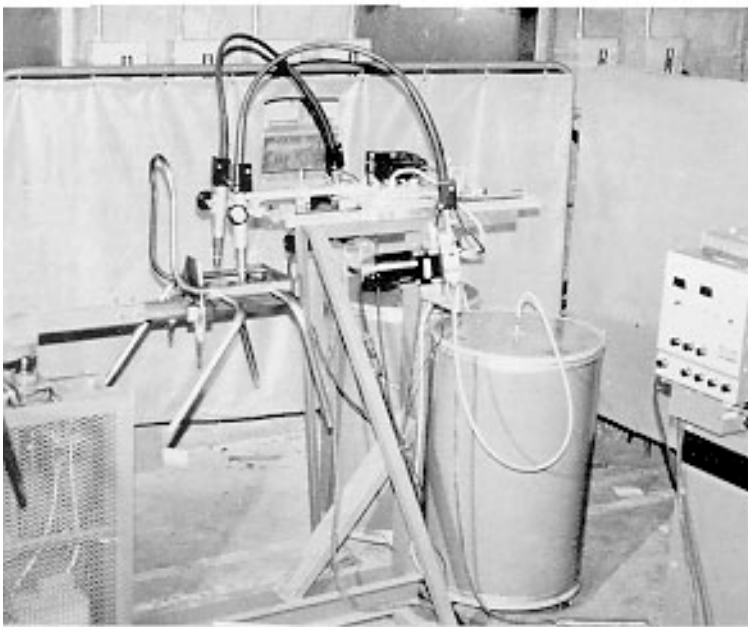
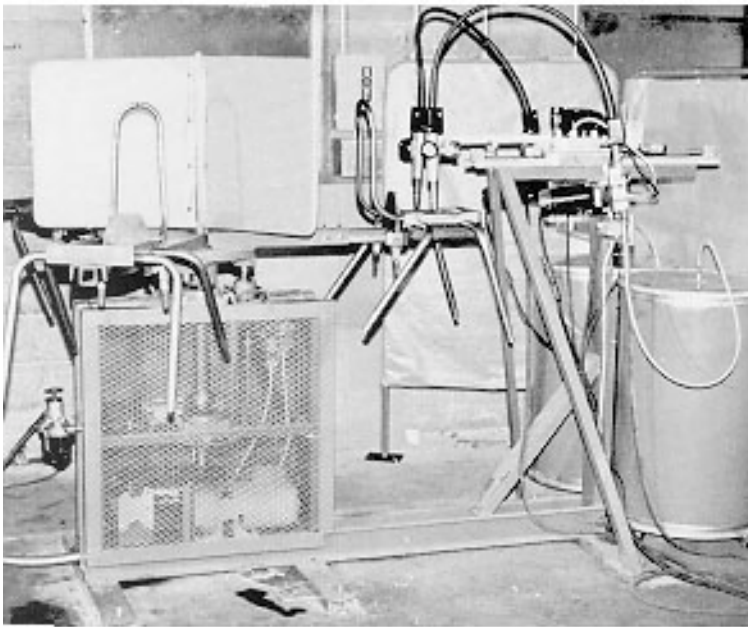
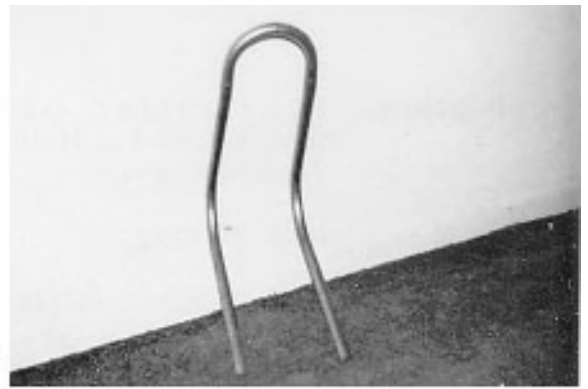


**Application:** Automating the fabrication of tublar steel chair frames.

**Process:** MIG Welding.

**Equipment:** Bug-O Skip Welder.

**Savings:** Eliminated skilled operators, improved quality and appearance, production increased four times, annual savings \$16,159.00



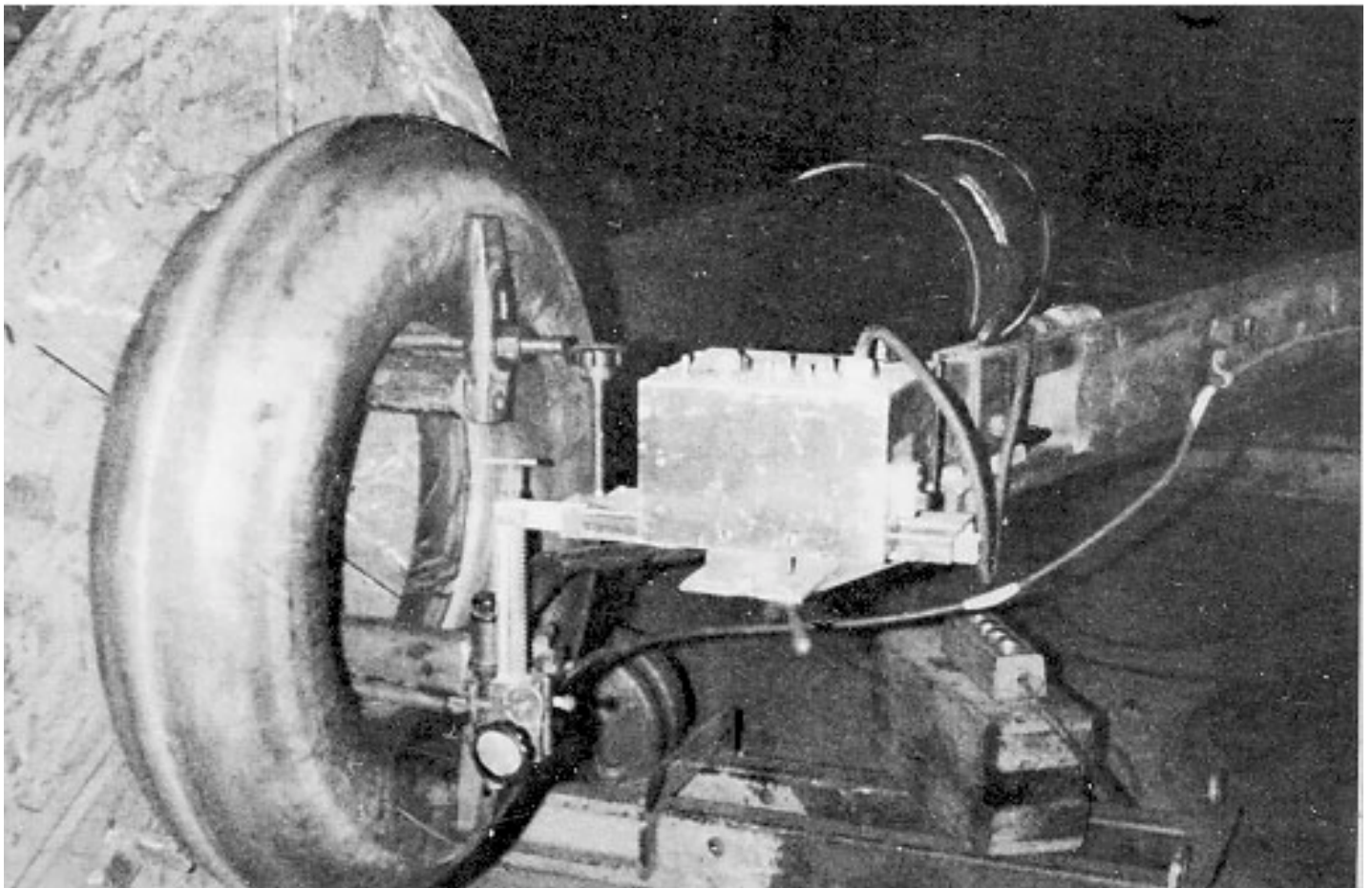
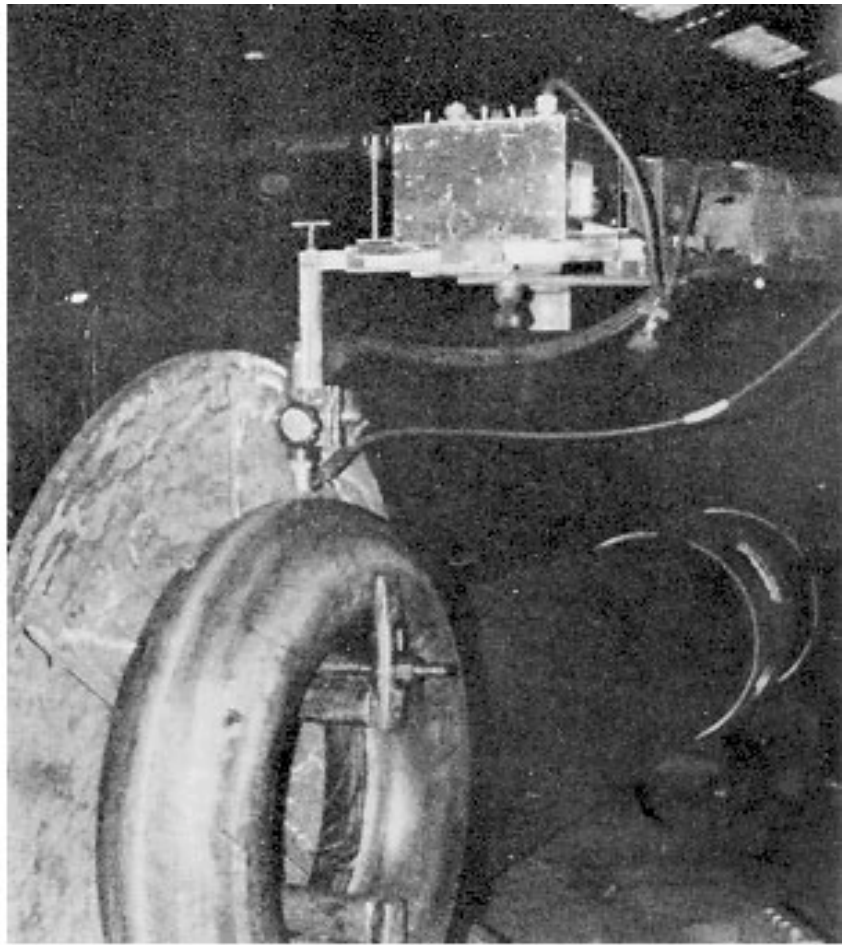


**Application:** Fabrication of return bins for heat treating furnances.

**Process:** MIG Welding.

**Equipment:** Bug-O Speed Weaver II mounted on customer's fixture.

**Savings:** Costs reduced 60%, grinding and repair eliminated.

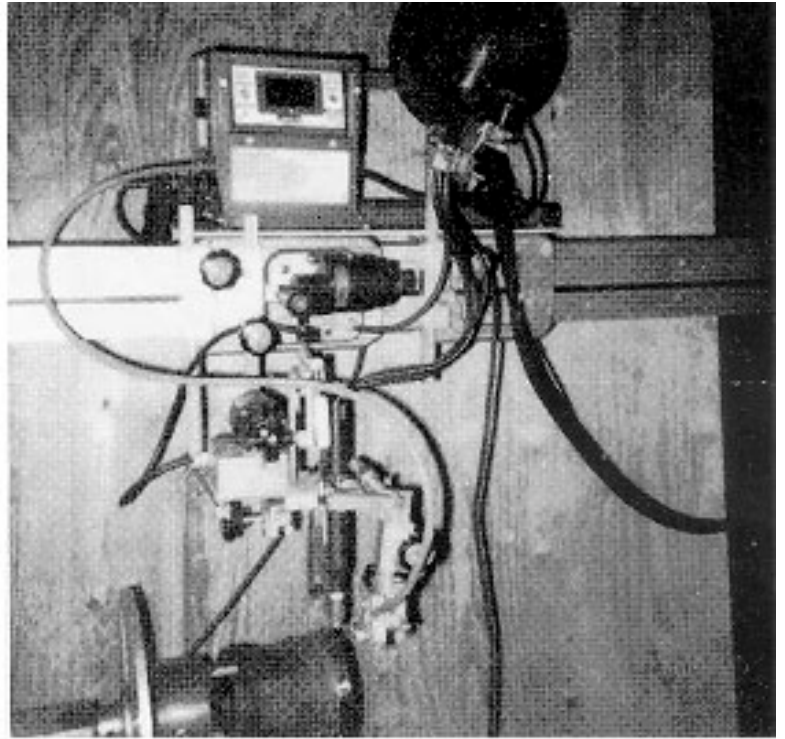
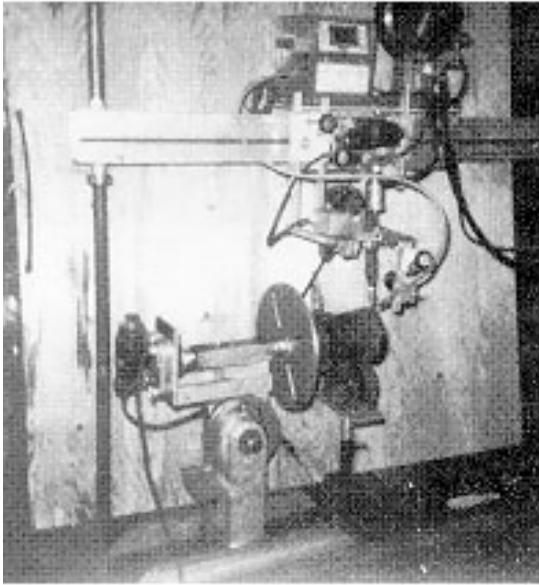


**Application:** Rebuilding shafts.

**Process:** TIG Welding with cold wire feed.

**Equipment:** Bug-O Heavy Duty Welding Kit and miscellaneous parts mounted on customer's fixture.

**Savings:** Production time reduced 50%.

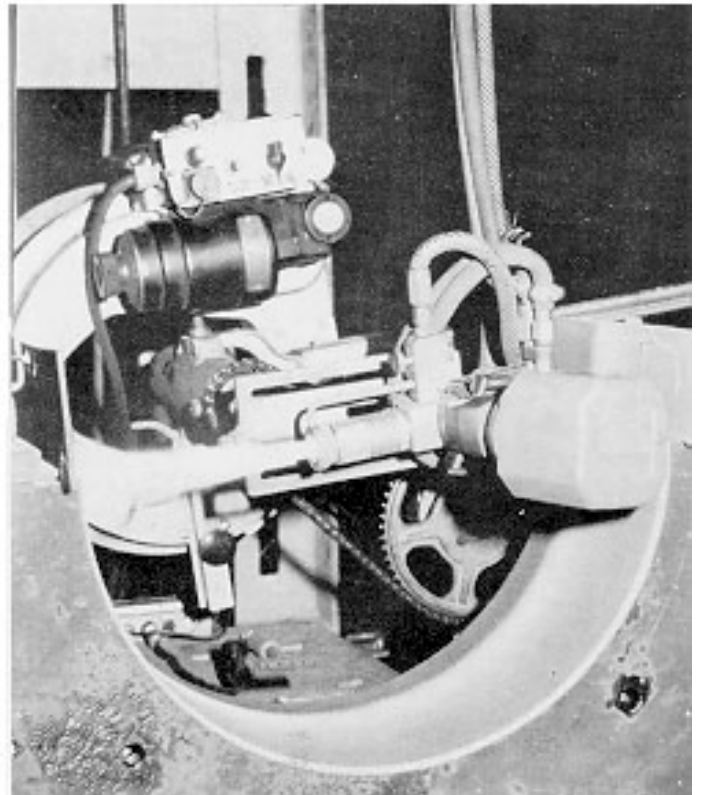


**Application:** Rebuilding Bearing Housings.

**Process:** Thermal Spraying.

**Equipment:** HOB-O with equipment mounted by customer.

**Savings:** \$100,000.00 per year.



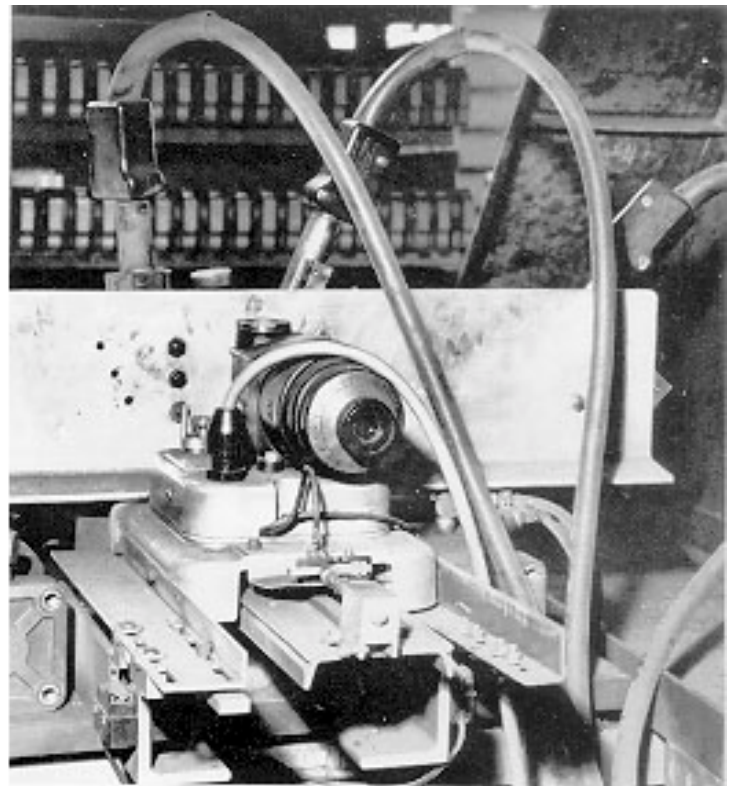
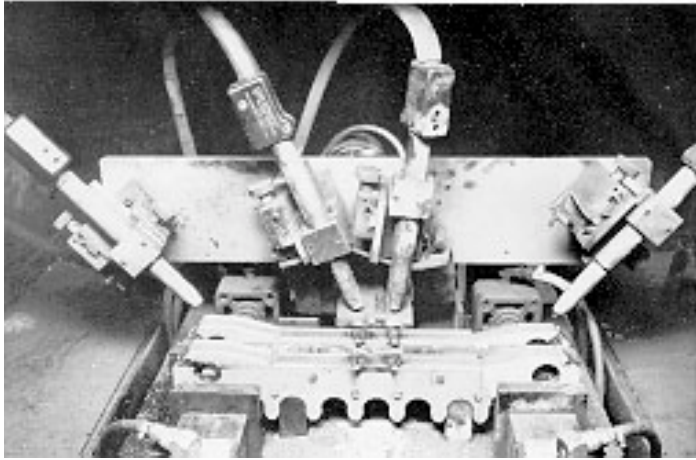


**Application:** Mechanizing four semiautomatic welding guns.

**Process:** MIG Welding.

**Equipment:** Bug-O DC IV with Limit Switch Kit and customer's fixture.

**Savings:** Production increased 300%.

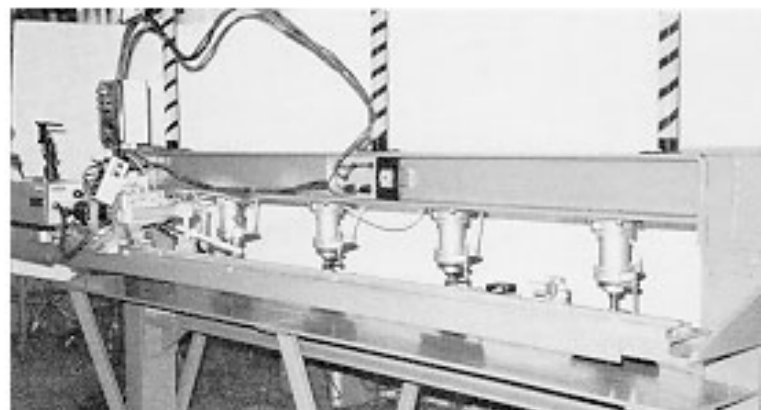
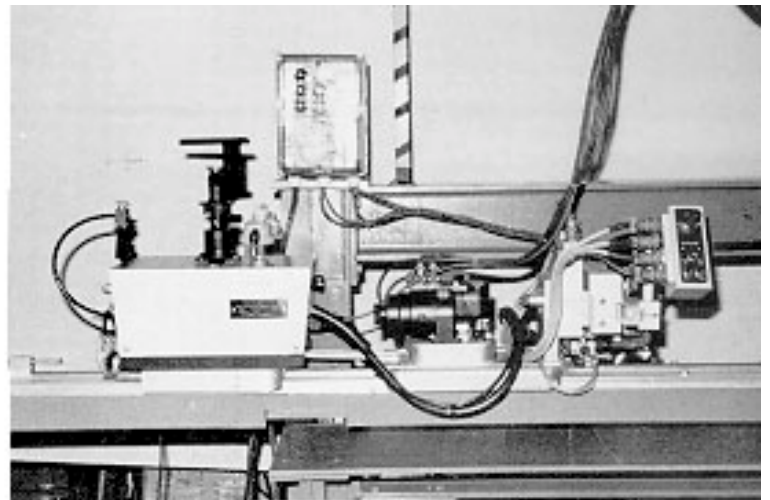
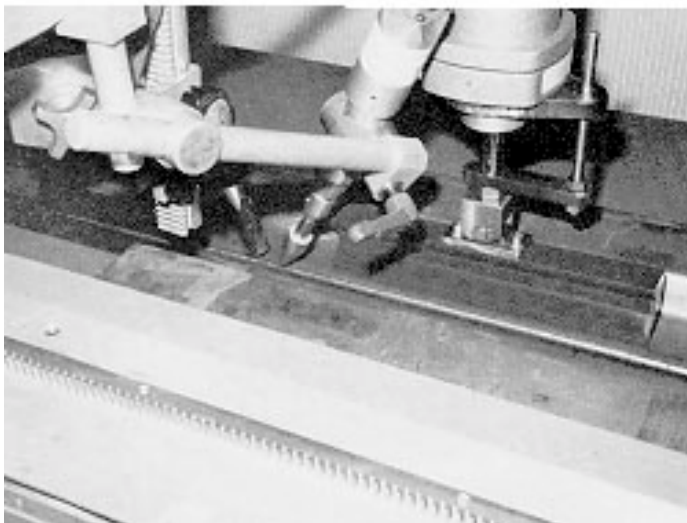


**Application:** Fabrication of highway truck bodies.

**Process:** MIG Welding.

**Equipment:** Bug-O DC IV, Trailer, Rails, mounted on customer's fixture.

**Savings:** Welding time reduced 75% per truck.

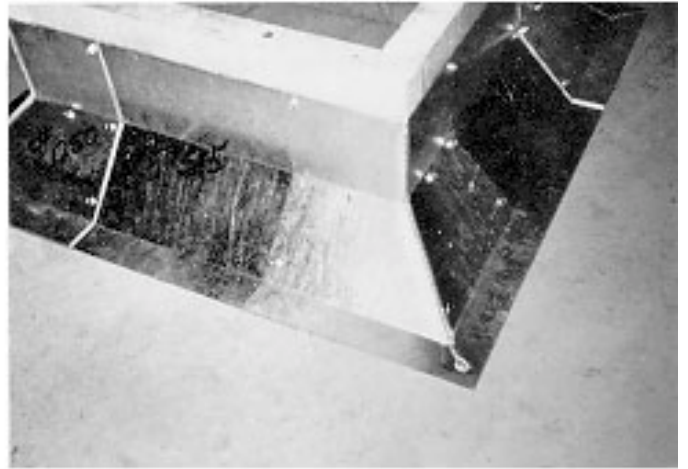
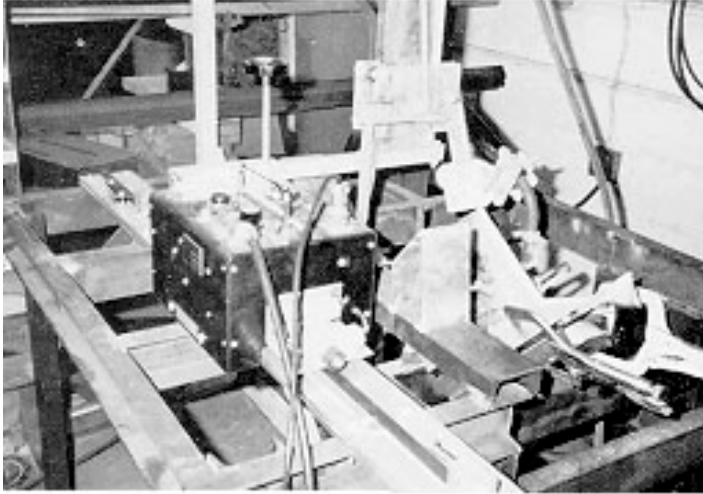


**Application:** Welding roof curb corners.

**Process:** MIG Welding.

**Equipment:** Bug-O DC Skip Welder.

**Savings:** Production increased 50%, quality improved 100%, worker fatigue greatly reduced.



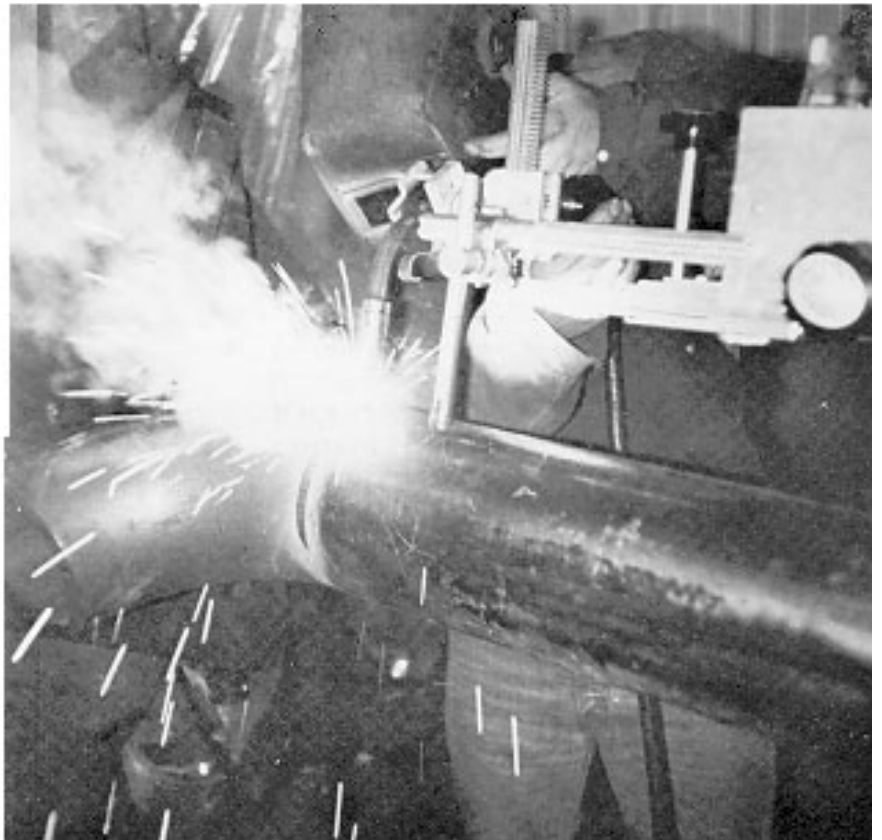
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**Application:** Pipe Welding.

**Process:** Flux cored arc welding (two torches used).

**Equipment:** Bug-O Speed Weaver II mounted on customer's fixture.

**Savings:** Production increased 125%.



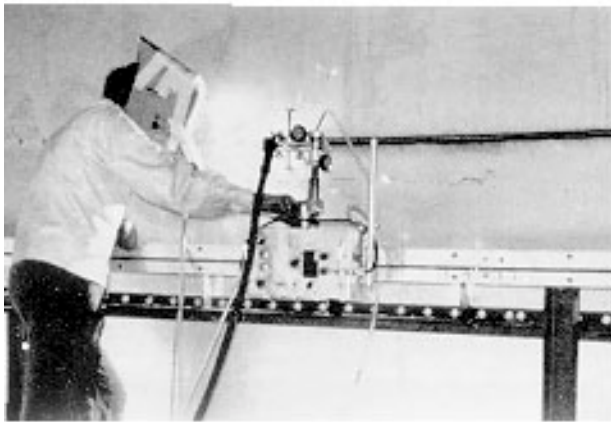
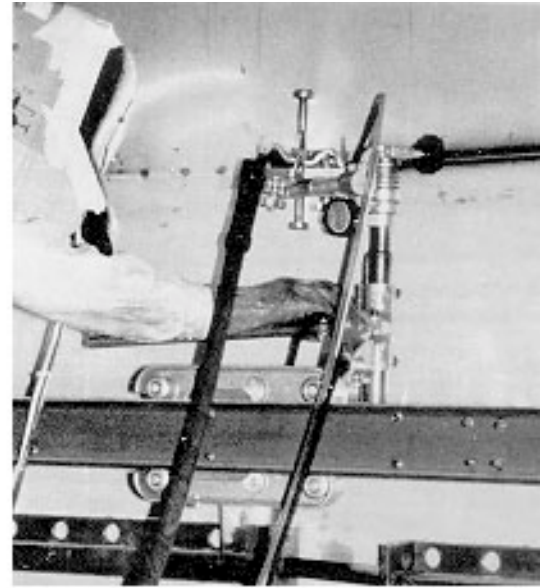


**Application:** Building wire storage tanks.

**Process:** MIG Welding.

**Equipment:** Bug-O DC IV, Bug-O-Matic and Bent Rail mounted on customer's fixture.

**Savings:** Welding speed increased 2 1/2 times with substantial improvement in quality and appearance.



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**Application:** Building up and hardfacing gyratory crusher concaves.

**Process:** MIG Welding.

**Equipment:** Bug-O CIR-5505 with slow-speed drive unit mounted on customer's fixture.

**Savings:** Uniform heat input, controlled metallurgy and 20 lbs. (9.1 kg) per hour deposition without operator fatigue.

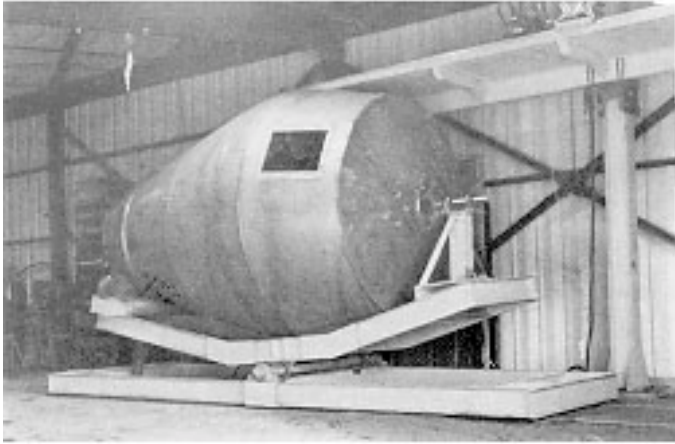
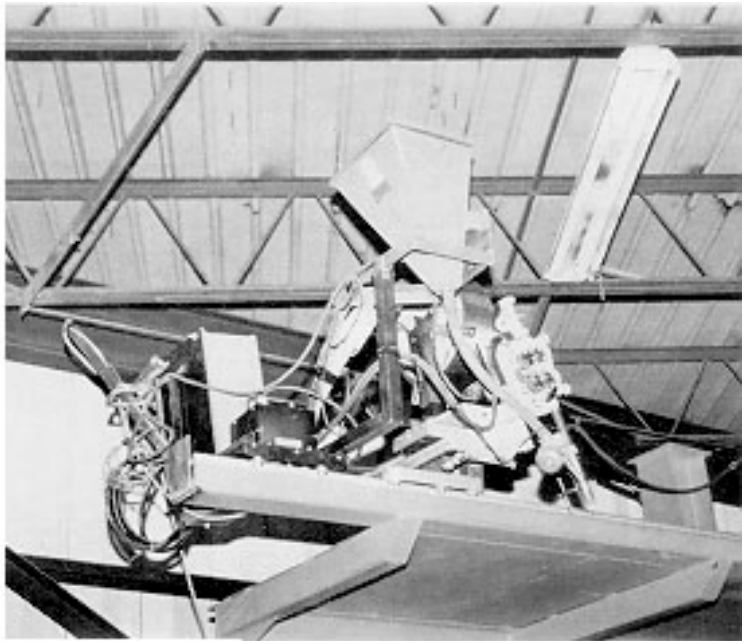


**Application:** Fabricating concrete mixer tanks.

**Process:** Sub Arc Welding.

**Equipment:** Bug-O DC DC Heavy Duty Welding Kit.

**Savings:** Production increased 60%, quality and appearance improved 100%.

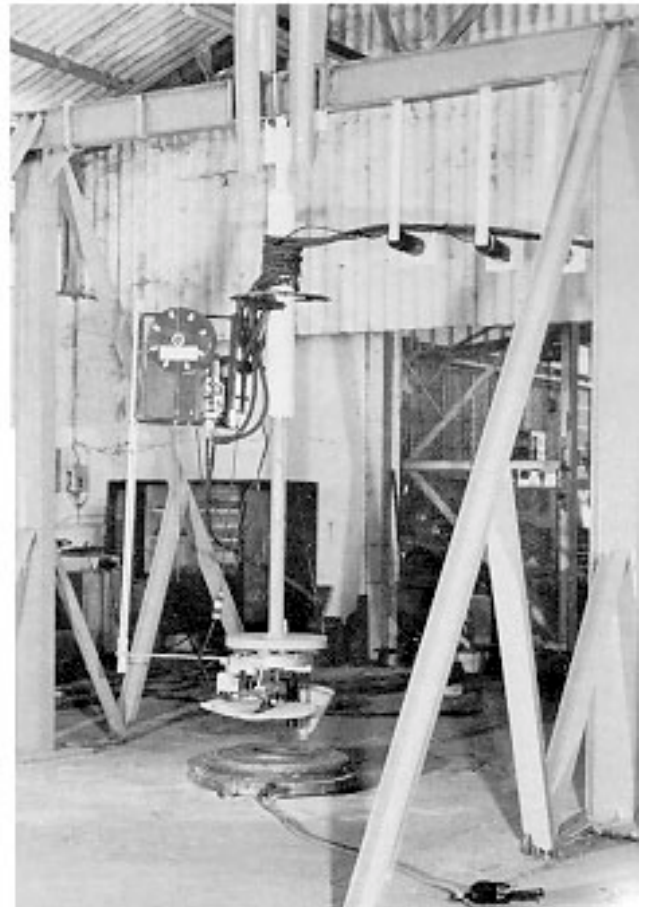


**Application:** Fabrication of flanges from weld metal.

**Process:** Sub Arc Welding.

**Equipment:** HOB-O mounted on customer's fixture.

**Savings:** Enabled customer to meet delivery schedule.



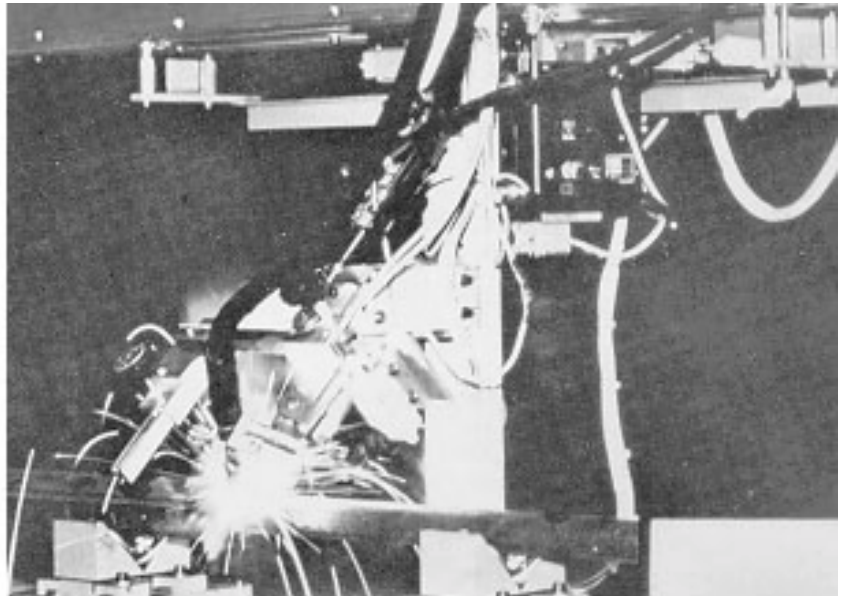


**Application:** Manufacturing steel light posts.

**Process:** MIG Welding.

**Equipment:** Beam Bug modified by customer on special fixture.

**Savings:** Welding time reduced 80%.



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**Application:** Fabrication of "H" Beams.

**Process:** Flux Cored Arc Welding.

**Equipment:** Bug-O DC IV with trailer carriage and special torch mounting components.

**Savings:** Operating factor increased 150%, production increased 242% with minimum distortion.





# Applications

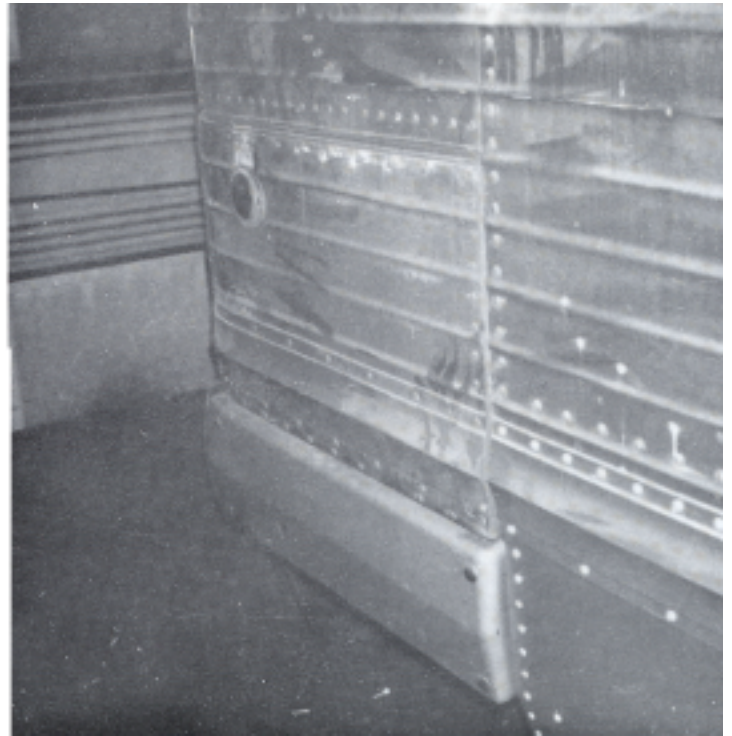
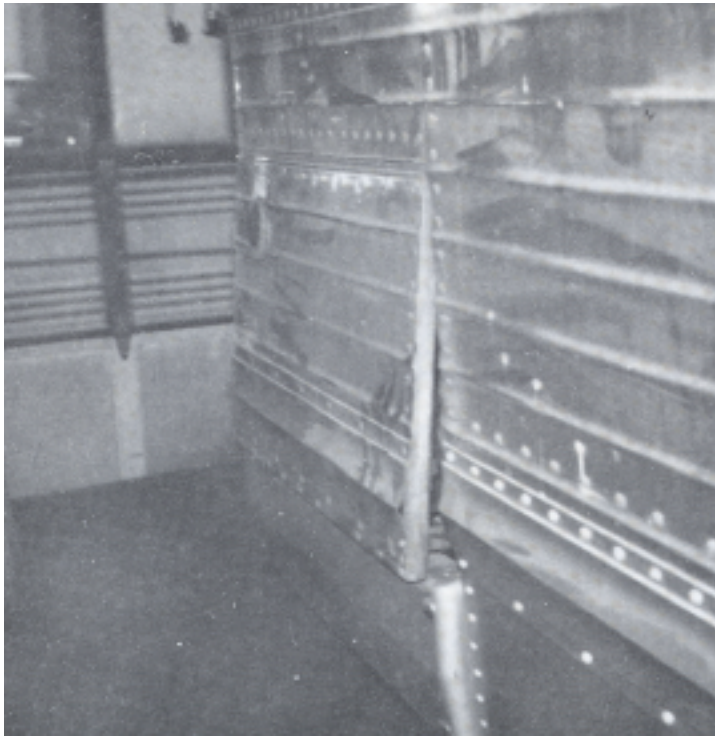
## Inspection / Miscellaneous

**Application:** Replace mechanical latches on bus transmissions and radiator doors.

**Process:** Magnets used in place of mechanical latches.

**Equipment:** Bug-O ARM-2244 magnets and fasteners.

**Savings:** Magnets provided a maintenance-free solution.



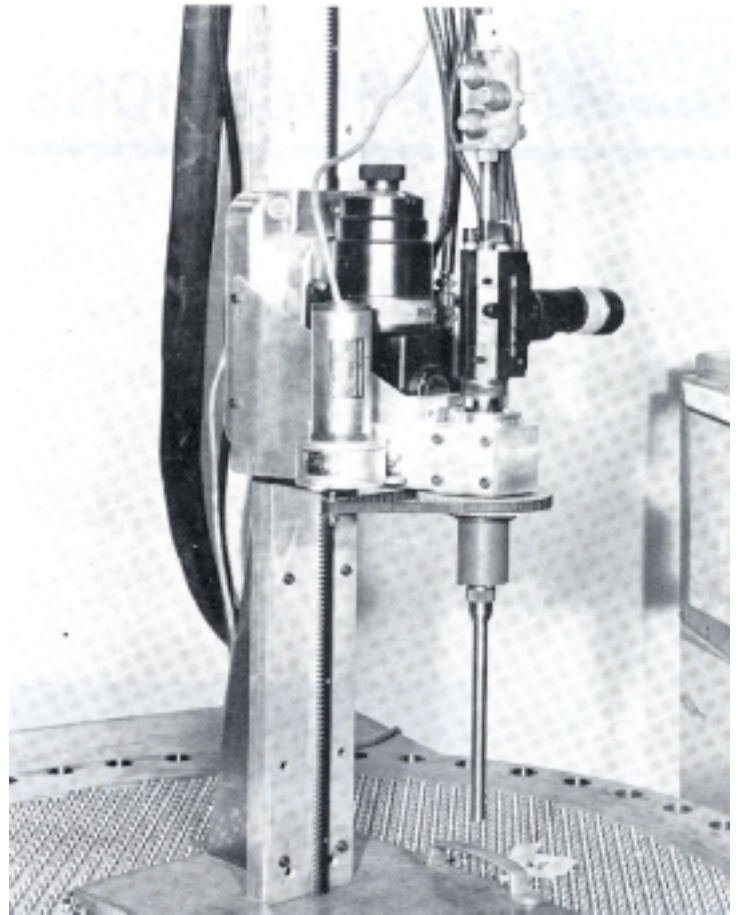


**Application:** Repair of mislocated holes on heat exchanger tube sheets.

**Process:** MIG Welding.

**Equipment:** Bug-O DC III and rail. Welding gun mounted by customer.

**Savings:** Precise control of weld location and quality.



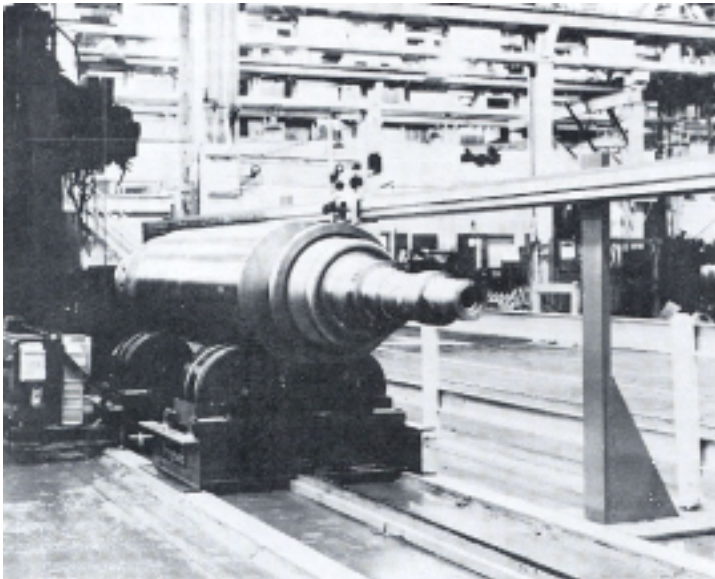
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**Application:** Non-destructive inspection of large shafts.

**Process:** Ultrasonic inspection.

**Equipment:** Bug-O General Welding Kit, customer's fixture and turning rolls.

**Savings:** Eliminated bottleneck and reduced costs.



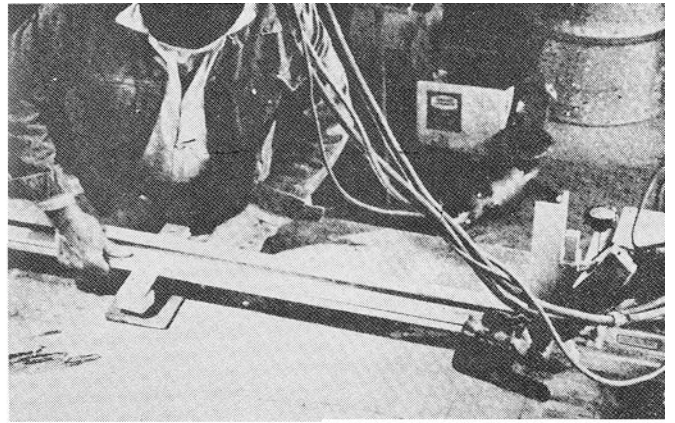


**Application:** Artistic rendering.

**Process:** MIG Welding.

**Equipment:** Bug-O General Welding Kit.

**Savings:** Enabled artist to use precision control for rendering in a short time.



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**Application:** Grit blasting panels.

**Process:** Grit blasting.

**Equipment:** Bug-O Speed Weaver II mounted on customer's fixture.

**Savings:** 50% reduction in man hours per panel.

