

SECTION 05051

REPLACEMENT OF DIAGONAL RODS AND HARDWARE

PART 1 - GENERAL

1.01 DESCRIPTION

- A. **Work Included:** The work under this Section includes all aspects of the replacement of the diagonal rods and hardware. This includes, but is not limited to, fabrication, machining, purchase, and installation of all components of the diagonal assemblies and other miscellaneous hardware, including set screws, bolts and nuts, on the towers. For the purpose of these Specifications, the term "base unit" refers to the Z unit, the term "lower tower unit" refers to and D1 - D10, and the term "upper tower unit" refers to Units D11 - D16. Units Z and D1 - D16 are identified on Drawing S1.
- B. Related requirements specified elsewhere:
1. Scope of Work, Section 0500
 2. Tower Assembly, Section 05132

1.02 REFERENCE STANDARDS

- A. American Society for Testing and Materials
1. ASTM A36-88b - Specification for Structural Steel
 2. ASTM A276-89 - Specification for Stainless and Heat-Resisting Steel Bars and Shapes.

1.03 SUBMITTALS

- A. The Contractor shall prepare and submit shop drawings for all components to be used in replacement of the diagonal rods and hardware. Shop drawings shall include full dimensions of all components and shall clearly illustrate any attachments that will be made. Shop drawing submittals, consisting of five sets (5) shall be made to the Owner for approval by the Engineer.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. **Clevises:** Adjustable drop forged yoke ends, or clevises, shall be Clevis No. 1 $\frac{1}{2}$ for upper tower units and Clevis No. 2 for lower tower units. All clevises shall be fabricated from Type 304, stainless steel.

- B. Bolts: All bolts shall be Type 304, stainless steel. For the base unit, new bolts shall be the same physical size as the existing with like washers and nuts. For the diagonal members, the new bolts shall be $\frac{5}{8}$ in. diameter for the lower tower units and $\frac{1}{2}$ in. diameter for the upper tower units.
- C. Diagonal Rods: All rods shall be ASTM A276, Type 304, stainless steel, $\frac{5}{8}$ in. diameter for lower units, $\frac{1}{2}$ in. diameter for upper units. Threads shall be cut to match yoke components.
- D. Set Screws: All set screws shall be sized to match original set screws. All set screws shall be Type 304, stainless steel.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Clevises: All existing clevis components in both the upper and lower tower units shall be replaced with new clevis components in accordance with this Section.
- B. Bolts: All existing bolts, including nuts and washers, in the base unit, and the upper and lower tower units shall be replaced with new bolts, nuts, and washers in accordance with this Section.
- C. Rods: The existing diagonal rods, consisting of four elements on each set of diagonal braces on each face of each tower unit shall be replaced. The new rods shall be continuous from clevis to clevis. Rods shall be threaded in opposite hand threads at each end to permit adjustment. Threads shall match the threads of the clevis components.
- D. Tension Ring D6: The existing D6 shall be restored on the tower as an architectural element but will not serve a structural purpose. See Detail 6/A-1.
- E. Set Screws: All existing set screws used to connect the star post members and the sockets shall be replaced. The new set screws shall be manufactured in accordance in accordance with this Section and match the physical dimensions of the existing taps in the sockets. Existing sockets shall be re-tapped as necessary to accept new set screws.

END OF SECTION 05051

SECTION 05052

REPLACEMENT OF GUY WIRE COMPONENTS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work Included: The work under this Section includes purchase and installation of new guy wire components at each new guy wire location. This includes, but is not limited to, guy cable, eyebolts, turn buckles, wire rope clips, and wire rope thimbles, and preformed grip assemblies.
- B. Related requirements specified elsewhere:
 - 1. Scope of Work, Section 0500
 - 2. Tower Plumbing and Guy Wire Tensioning, Section 05133

1.02 REFERENCE STANDARDS

- A. American Society for Testing and Materials
 - 1. ASTM A36-88b - Specification for Structural Steel
 - 2. ASTM A53-88a - Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - 3. ASTM A475-78 - Specification for Zinc-Coated Steel Wire Strand.

1.03 QUALITY ASSURANCE

- A. Acceptable Contractors: A company specializing in providing maintenance and rigging services for self-supporting and guyed towers in the broadcast, microwave, and two-way cellular industries.

1.04 SUBMITTALS

- A. The Contractor shall prepare and submit shop drawings for all permanent fixtures to be used. Shop drawings shall include full dimensions for all components and shall clearly illustrate any attachments that will be made to the tower during the work. Shop drawings submittals, consisting of five sets, shall be made to the Owner for approval by the Engineer.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Guy Wire: $\frac{3}{8}$ in. diameter Seimens-Martin Grade 7-wire galvanized steel strand, conforming to ASTM A475, Class A coating.

- B. **Preformed Wire Grips:** Preformed wire grips shall be sized for the diameter and grade of the guy strand and shall develop at least 95 percent of the guaranteed ultimate strength of the guy strand.
- C. **Turnbuckles:** Eye and Eye turnbuckles for use on guy wires shall be ½ in. by 12 in. HG-226 by Crosby Group, Tulsa, OK or equivalent.
- D. **Wire Rope Thimbles:** Open pattern heavy duty wire rope thimbles G-414 by Crosby Group, Tulsa, OK or equivalent.
- E. **Strain Insulator:** Galvanized strain insulator clevises, No. J732 by Joslyn, or equivalent.
- F. **Guy Anchor Posts:** New guy anchor post, shall be 6 in. diameter, extra-strong, A 53 Grade B pipe fabricated to a length of 21 ft and hot dip galvanized. The guy anchor post shall be filled with concrete.
- G. **Restraining Rings:** New restraining rings, where required, shall be fabricated from A36 steel to match the existing and galvanized. New bolts shall be Type 304 stainless steel for diameter and length to match the existing.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. New guy wire components shall be installed in conjunction with the work performed in Section 05132, Tower Assembly.

END OF SECTION 05052

SECTION 05053

REPLACEMENT SOCKETS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. **Work Included:** The work under this Section consists of providing the necessary labor, materials and equipment to fabricate new cast iron sockets to be used in the restored towers. A total of five socket types exist in the towers. The quantity of each socket type required can only be determined after the towers are disassembled and the socket evaluation effort completed. The work of fabricating new sockets is a specialized task to be completed by a foundry or casting company experienced in the fabrication of custom castings with complex geometry.
- B. **Unit Prices:** The work under this Section will be completed on a unit price basis in accordance with the schedule shown in the Bid Proposal Form. For each socket type, the Contractor shall provide a lump sum price for the first new socket of each type. The lump sum price shall include all labor, materials and equipment to cast the first socket of that type. In addition, the Contractor shall provide a unit price for each additional socket of each type.
- C. **Related requirements specified elsewhere:**
1. Scope of Work, Section 0500
 2. Unit Prices, Section 01026
 3. Evaluation and Testing of Sockets, Section 05541

1.02 REFERENCE STANDARDS

- A. **American Society of Testing and Materials**
1. ASTM A47-84 Ferritic Malleable Iron Castings
 2. ASTM A247 Method of Evaluating the Microstructure of Graphite in Iron Castings

1.03 QUALITY ASSURANCE

- A. **Acceptable Fabricator:** A company experienced in all phases of fabricating malleable iron castings, and the associated machining required to produce the finished component.
- B. **Materials Testing:** The Contractor shall employ a qualified testing laboratory to conduct materials testings as prescribed in ASTM A47-84.

1.04 SUBMITTALS

- A. Submit a detailed fabrication plan to be fabricated to the Engineer for review. The

fabrication plan shall include a detailed description of the methods to be used to make the molds, cast the materials, physical properties of the materials, methods of cleaning, and methods of annealing. Allow four weeks for review by the Engineer.

B. Submit reports of all tests conducted on material used to cast the sockets.

1.05 UNIT PRICES

A. The Contractor shall submit unit prices as required on the Bid Proposal Form.

B. For the portion of the work to be performed on a unit price basis, quantities will be measured according to Section 01026.

PART 2 - PRODUCTS

2.01 MALLEABLE CAST IRON

A. The cast iron material shall be ASTM A47, Grade 35018, minimum yield strength of 35 ksi and minimum elongation of 18 percent. The chemical composition of the cast iron material shall conform to Section 2.02.

2.02 COMPOSITION OF EXISTING SOCKETS

A. The chemical composition of the cast iron material in the existing sockets is approximately as follows:

1. Carbon	2.6%
2. Manganese	0.28%
3. Phosphorus	0.25%
4. Sulphur	0.12%
5. Silicon	0.71%

2.03 PATTERNS FOR NEW SOCKETS

A. Patterns for the new sockets shall be taken from existing sockets of each type.

B. Five unique socket types exist as described below:

1. Type A: Lower sockets at base of Section D1. Socket accepts 2 ½ in. star post at top, 2 in. star post from sides and threaded bolt and leveling assembly from base section Z. Accepts ⅝ in. diameter bolt for clevis attachment on upper side only.
2. Type B: Typical lower section sockets used in section D1 thru D10. Socket accepts 2 ½ in. star post member from top and bottom, 2 in. star post member from sides, and ⅝ in. diameter bolt for clevis attachments on upper and lower sides.
3. Type C: Transition sockets between sections D10 and D11. Socket accepts 2 ½ in. star post member from bottom, 2 in. star post member from top, 2 in. star post member from sides, ⅝ in. diameter bolt for clevis attachment on lower side, and ½ in. diameter bolt for clevis attachment on upper side.

4. Type D: Typical upper section sockets used in sections D11 through D16. Sockets accepts 2 in. star post from top and bottom, 1 ½ in. star post from sides, and ½ in. diameter bolts for clevis attachment on the lower and upper sides.
5. Type E: Upper sockets at top of section D16. Socket accepts 2 in. star post at bottom, 1 ½ in. star posts at sides, and connector Q1 at top.

PART 3 - EXECUTION

3.01 PATTERN FOR CASTING

- A. Existing sockets shall be used to make patterns for the new castings. Existing sockets to be used as patterns shall be selected from the socket inventory after tower disassembly. The selected sockets shall be cleaned as prescribed in Section 05541 and submitted to the Engineer for review and approval.
- B. The existing sockets approved for use as patterns shall be used to form a mold using an alloy of low melting point. The mold shall be enlarged to account for shrinkage of the casting.
- C. The modified mold shall be used to make wax patterns of the sockets. These patterns shall be submitted to the Engineer for review and approval.

3.02 CASTING

- A. The wax patterns shall be used to fabricate sand molds for casting.
- B. Risers shall be incorporated into the sand casting to facilitate material injection.
- C. When cool, the casting shall be removed from the mold and cleaned by either sand blasting, pickling, or hand scouring.

3.03 ANNEALING

- A. The castings shall be packed in annealing boxes with an oxidizing agent.
- B. The castings shall be heated in an annealing furnace. The annealing cycle shall be detailed in the fabrication plan.
- C. Castings shall not be quenched in oil or water as part of the cooling cycle.

3.04 FINAL FABRICATION

- A. After annealing, the sockets shall be drilled to accept the bolts for the clevis attachment.
- B. Holes for the set screws shall be drilled and tapped to mate the set screws.

END OF SECTION 05053

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**SECTION 05131
TOWER DISASSEMBLY****PART 1 - GENERAL****1.01 DESCRIPTION**

A. **Work Included:** The work under this Section includes all aspects of the tower disassembly work. This includes, but is not limited to, furnishing all jigs, braces, temporary supports, jacks and other equipment needed to complete the disassembly work at the tower. The Contract Documents describe a methodology that may be used to disassemble the tower into sub-assemblies that can be lowered and transported to the storage yard.

B. **Related requirements specified elsewhere:**

1. Scope of Work, Section 0500

1.02 QUALITY ASSURANCE

A. **Acceptable Contractors:** A company specializing in providing maintenance and rigging services for self-supporting and guyed towers in the broadcast, microwave, and two-way cellular industries.

PART 2 - PRODUCTS**2.01 EQUIPMENT**

A. **Hydraulic Rigging Equipment:** Hydraulic jacks and pump equipment shall be manufactured by ENERPAC Construction Hydraulic Tools, Butler, WI, or equal.

PART 3 - EXECUTION**3.01 WORK BY THE OWNER**

A. Prior to tower disassembly, the Owner shall disconnect electric service to the tower.

3.02 TOWER DISASSEMBLY

General: The tower is to be disassembled from the top down. Sub-assemblies are to be removed and lowered to the street.

A. **Sequence:** The tower is to be disassembled in the following sequence:

1. Remove components of elevator.

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2. Remove light fixtures.
3. Remove upper and middle guy.
4. Remove the set screws on the upper vertical star post connection at joint D11/D12.
5. Using the separation jig, separate the star post members of section D12 from the sockets at joint D11/D12. Lower subassembly D12, D13, D14, D15, D16 and candelabra F to street level.
6. Remove vertical star posts at D12 for transport of subassembly.
7. Attach temporary guy wires to tower at joint D4/D5.
8. Remove the set screws on the upper vertical star post connection at D5/D6.
9. Using the separation jig, separate the star post members of section D6 from the sockets at joint D5/D6. Lower subassembly D6, D7, D8, D9, D10, and D11 to street level.
10. Remove vertical star posts at D6 for transport of subassembly.
11. Remove upper vertical star posts at connection between D1 and base post Z.
12. Lower subassembly D1, D2, D3, D4, D5 to street level.
13. Remove vertical star posts at D1 for transport of subassembly.
14. Unbolt and remove base post Z from foundation. Protect exposed bolt ends on foundation.
15. Guy anchor posts to remain.

3.04 TRANSPORTATION AND STORAGE OF SUB-ASSEMBLIES

A. General: The Contractor shall furnish all equipment, rigging and labor to remove the tower sub-assemblies from the site.

B. Components of the sub-assemblies shall be fully supported during handling and transportation to the storage yard. The sub-assemblies shall be supported and stored so as to avoid undue stress on any component. No sub-assembly or any component of the Tower should be stored in contact with the ground.

END OF SECTION 05131

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**SECTION 05132
TOWER ASSEMBLY**

PART 1 - GENERAL

1.01 DESCRIPTION

A. **Work Included:** The work under this Section includes all aspects of the tower assembly work. This includes, but is not limited to, equipment needed to complete the assembly work. The Contract Drawings describe a methodology that may be used to assemble the tower.

B. **Related requirements specified elsewhere:**

1. Scope of Work, Section 0500
2. Tower Plumbing and Guy Wire Tensioning, Section 05133
3. Painting, Section 09900

1.02 QUALITY ASSURANCE

A. **Acceptable Contractors:** A company specializing in providing maintenance and rigging services for self-supporting and guyed towers in the broadcast, microwave, and two-way cellular industries.

PART 2 - PRODUCTS

N/A

PART 3 - EXECUTION

3.01 ASSEMBLY

General: The tower is to be assembled from the top up. Sub-assemblies are to be lifted and assembled in place.

A. **Sequence:** The tower is to be assembled in the following sequence:

1. Install base post assembly Z to foundation anchor bolts. Plumb base section.
2. Attach vertical star posts at D1 and raise subassembly D1, D2, D3, D4 and D5 into place and complete connections between D1 and base post assembly Z.
3. Install temporary guy wires to tower at D4/D5.

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4. Attach vertical star posts at D6 and raise subassembly D6, D7, D8, D9, D10 and D11 into place and complete connections at D5/D6.
5. Install guy wires to tower at D9/D10.
6. Attach vertical star posts at D12 and raise subassembly D12, D13, D14, D15, D16 and candelabra F into place at complete connections at D11/D12.
7. Install guy wires to tower at D12/D13 and D15/D16.
8. Install light fixtures.
9. Install elevator components.

3.02 TOWER CONNECTIONS

During tower erection, all bolted and screwed connections shall be tightened at least 1/2 turn past the thumb tight condition.

3.03 TOWER ALIGNMENT

Following tower erection, the tower shall be aligned and tension of guy wires set in accordance with Section 05133.

END OF SECTION 05132

SECTION 05133

TOWER PLUMBING AND GUY WIRE TENSIONING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. **Work Included:** The work under this Section includes plumbing of the towers to the proper vertical alignment and tensioning of the guy wires to properly restrain tower movements. Plumbing of the towers requires measurements of out-of-plumbness at the points of guy wire attachment of each tower and adjustment of the guy wires to correct any misalignment. Tensioning of the guy wires requires measurement of existing guy tensions at each tower and adjustment to provide the specified tensions.
- B. Related requirements specified elsewhere
 - 1. Scope of Work, Section 0500
 - 2. Unit Prices, Section 1026
 - 3. Replacement of Guy Wire Components, Section 05052

1.02 REFERENCE STANDARDS

- A. EIA/RS222-Revision D

1.03 QUALITY ASSURANCE

- A. **Acceptable Contractors:** A company specializing in providing maintenance and rigging services for self-supporting and guyed towers in the broadcast, microwave, and two-way cellular industries.
- B. **Site Conditions:** Work specified in this Section shall not be preformed during winds of greater than 10 miles per hour.

1.04 SUBMITTALS

- A. The Contractor shall prepare and submit shop drawings for all temporary fixtures to be used for the Work. Shop drawings shall include full dimensions for all components and shall clearly illustrate any attachments that will be made to the tower components. Shop drawing submittals, consisting of five sets, shall be made to the Owner for approval by the Engineer.
- B. The Contractor shall prepare and submit a plan for measuring plumbness of the towers and the applied guy tensions. The proposed plan shall provide all detail necessary to describe the type of equipment to be used and procedures for completing the work. The plan shall be submitted to the Owner at least 10 days prior to conducting the plumbing and guy tensioning work on the tower. The plan shall be approved by the Engineer prior to being used in the field.

PART 3 - EXECUTION

- A. Temporary guy wires shall be provided, installed, and removed by the Contractor as necessary during execution of the work included under this Section.
- B. All field cut guy cables shall have cut ends sprayed with zinc rich paints.
- C. Sequence of Work to be performed at each Tower:
 - 1. Following tower erection, measure out-of-plumbness at each point of guy wire attachment on the tower.
 - 2. Sequentially adjust opposing guy wires until out-of-plumbness at each point of guy wire attachment on the tower does not exceed 3 in. in either of two orthogonal vertical planes.
 - 3. Sequentially adjust guy tensions to 550 lbs. (± 10 lbs) (at 70°F) in a minimum of 3 adjustment cycles. Adjust guy wire lengths as necessary. Sequence tensioning to tension that shortest guy at each level first. In the final position, with the tower plumb and the guy tension set properly, each turnbuckle shall have a remaining adjustable range of at least 2 in. in each direction. Guy tensions may be measured by mechanical tensiometer, or by measurement of guy sag, or by other method. The methods proposed by the contractor for measuring guy tensions and the adjustments to the specified guy tensions for ambient temperature variations, shall be included in the plan submitted to the Owner for approval by the Engineer.
 - 4. Repeat setups 2-4 as necessary.

END OF SECTION 05133

SECTION 05541

EVALUATION AND TESTING OF SOCKETS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work Included: The work under this Section consists of cleaning the sockets and, evaluation and testing of the sockets to locate significant flaws.
- B. Evaluation of sockets by magnetic particle testing shall be done by unit prices in accordance with Section 01026.
- C. Related requirements specified elsewhere:
 - 1. Scope of Work, Section 0500
 - 2. Painting, Section 09900

1.02 REFERENCE STANDARDS

- A. ASTM A275-86 - Method for Magnetic Particle Examination of Steel Forgings.

1.03 QUALITY ASSURANCE

- A. Acceptable Laboratories: The Contractor shall employ and pay an acceptable testing laboratory for the purpose of socket evaluation work. The laboratory shall have a minimum five years experience in magnetic particle testing of structural components.
- B. Visual inspection of sockets shall be performed by a Level 2 ASNT Inspector qualified under the requirements of SNT-TC-1A.
- C. Magnetic Particle Testing shall be performed by a Level 2 ASNT Inspector qualified under the requirements of STN-TC-1A.

1.04 SUBMITTALS

- A. The Contractor shall prepare and submit a detailed procedure for evaluation of the sockets. The detailed plan shall be in conformance with this Section of the Specifications and shall conform to methods outlined in ASTM A275. As a minimum, the detailed procedure shall include:
 - 1. A description of the materials, shapes and sizes of specimens to which the procedure is usually applied.
 - 2. Type of magnetization to be used.
 - 3. Equipment to be used for magnetization.
 - 4. Surface preparation, finishing and cleaning.

5. Ferromagnetic particles to be used; manufacturer color and suspension agent.
 6. Magnetization current and time involved.
 7. Sketches indicating the location type and amperage of each inspection area.
- B. The Contractor shall develop and maintain a log which records the status of the sockets at each stage of the evaluation process. The log shall be categorized according to the five socket types.
- C. The Contractor shall submit to the Owner the detailed procedure for socket testing. The plan shall be submitted at least 10 days prior to the start of work.

1.05 SUPPLEMENTAL INFORMATION

- A. Detailed information relating to evaluation techniques for assessment of the sockets is available from the Owner as a technical report titled "Metallurgical Evaluation of Cast Iron Star Post Sockets from Moonlight Towers, Austin, Texas" by Invetech, Inc. dated February, 1990.

PART 2 - PRODUCTS

NONE USED

PART 3 - EXECUTION

3.01 INITIAL INSPECTION

- A. Following disassembly of the tower and dismantling of the sub-assemblies into individual components, the socket pieces shall be separated from the other components. The total number of sockets, of each type, shall be recorded on the Socket Evaluation Log.
- B. A visual examination of each socket shall be made by the Testing Laboratory. Sockets with cracks, breaks, chips, or significant distortions shall be tagged as "DEFECTIVE" and return to the Owner. The total number of sockets, of each type, found defective shall be recorded on the Socket Evaluation Log. Socket not found defective shall be cleaned and tested in accordance with Section 3.02.

3.02 TESTING OF SOCKETS

- A. Each socket shall be cleaned by blast cleaning methods to a near-white metal (SSPC-SP10) cleanliness, in accordance with Steel Structures Painting Manual, Steel Structures Painting Council. At least 95 percent of the surface areas, including the interior sections, shall be free of all paint and visible residues. Refer to Section 09900 for cleaning required for painting.
- B. A visual examination of each sockets shall be made by the Testing Laboratory. Sockets with cracks, chips, broken segments or significant distortions shall be tagged as "DEFECTIVE" and returned to Owner. The total number of sockets, of each type, found defective shall be recorded on the Socket Evaluation Log.

- C. Sockets found acceptable in Sections 3.01-B and 3.02-B shall be visually examined in detail by the Testing Laboratory for surface defects including voids and discontinuities. Sockets with no surface defects and socket with surface defects with maximum dimension (length, width, or depth) of less than $\frac{1}{8}$ in. shall be tagged "ACCEPTABLE". No further evaluation of the "ACCEPTABLE" sockets shall be required.
- D. Sockets visually examined in Section 3.0-C and identified to have surface defects measuring at least $\frac{1}{8}$ in. on one dimension (length, width, or depth) shall be examined using the magnetic particle procedure.

3.03 EVALUATION OF TEST RESULTS

- A. Sockets found to contain indication or inclusions greater than or equal to $\frac{1}{4}$ in. on one dimension shall be considered defective and tagged "DEFECTIVE" and returned to the Owner. The total number of sockets, of each type, found defective shall be recorded on the Socket Evaluation Log.

END OF SECTION 05541

SECTION 05542

EVALUATION, TESTING AND STRAIGHTENING OF STAR POST MEMBERS
AND OTHER STRUCTURAL COMPONENTS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work Included: The work under this Section consists of cleaning of the star post sections and other structural members, evaluation and testing of the star post members to locate significant flaws, and methods for mechanical straightening of the members.
- B. Related requirements specified elsewhere:
 - 1. Scope of Work, Section 0500

1.02 REFERENCE STANDARDS

- A. American Institute for Steel Construction, AISC 9th Edition.

1.03 QUALITY ASSURANCE

- A. Acceptable Laboratories: The Contractor shall employ and pay for an acceptable testing laboratory for the purpose of member evaluation work. The laboratory shall have a minimum five year experience in inspection of structural steel fabrication and erection.

1.04 SUBMITTALS

- A. The Contractor shall prepare and submit to the Owner a detailed procedure for evaluation of the star post members. The detailed plan shall be in conformance with the provisions of this Section of the Specifications.
- B. The Contractor shall develop and maintain a log which records the status of star post members which have been evaluated. The log shall summarize the disposition of the members following evaluation.
- C. The Contractor shall prepare and submit to the Owner a detailed procedure for mechanical straightening of the star post members.

PART 2 - PRODUCTS

NONE USED

PART 3 - EXECUTION**3.01 CLEANING OF STAR POST MEMBERS**

- A. All star post members shall be cleaned by power tool methods (SSPC - SP3) in accordance with Steel Structures Painting Manual, Steel Structures Painting Council. As a minimum the cleaning process shall include removal of loose rust and loose paint. Refer to Section 09900 for cleaning required for painting.

3.02 VISUAL EXAMINATION OF STAR POST MEMBERS

- A. Following cleaning of the star post members, each member shall be visually inspected for defects. Defects to be identified include cracks, dents, distortions of the outstanding legs and excessive corrosion at the member ends. The following criteria shall be used:
 - 1. Any member with a crack shall be tagged as "DEFECTIVE".
 - 2. Any member with cross-sectional dimensional losses due to corrosion greater than 10 percent at the member ends shall be tagged as "DEFECTIVE".
 - 3. Any member that has been damaged, cut or otherwise altered from the original condition shall be tagged as "DEFECTIVE".

3.03 VISUAL EXAMINATION OF MISCELLANEOUS STRUCTURAL MEMBERS

- A. Miscellaneous structural members to be inspected shall include inventory items Z1 through Z12 and Q1 through Q17."
- B. Each miscellaneous structural member shall be cleaned in accordance with Section 3.01.
- C. Each miscellaneous structural member shall be visually inspected for defects. Defects to be identified include cracks, dents, distortions and excessive corrosion. The following criteria shall be used:
 - 1. Any member with crack shall be tagged as "DEFECTIVE".
 - 2. Any member with cross-sectional dimensional losses due to corrosion greater than 10 percent at any point shall be tagged as "DEFECTIVE".
 - 3. Any member that has been damaged, cut or otherwise altered shall be tagged as "DEFECTIVE".

3.04 TESTING OF STAR POST MEMBERS

- A. Each star post member found not defective according to Section 3.02A shall be evaluated for straightness.
- B. Member straightness shall be evaluated by one of the two methods described below:

1. A string line, pulled taught between the ends of the member at the point of maximum extremity of the star post, can be used as a reference line. The member straightness shall be evaluated by measuring the distance between the reference line and the member at the one-quarter points along the members length.
2. A straight bar or flat surface of sufficient length to fully support the member along the full length can be used as a reference line. The member straightness shall be evaluated by measuring the distance between the reference line and the member at the one-quarter points along the members length.

3.05 EVALUATION OF TEST RESULTS

- A. Acceptance of star post members shall be based on the following criteria:
 1. For members less than or equal to 6 ft in total length, members shall be considered acceptable if the maximum measured deviation is less than $\frac{1}{8}$ in.
 2. For member greater than 6 ft in length, members shall be considered acceptable if the maximum measured deviation is less than $\frac{1}{4}$ in.

3.06 MEMBER STRAIGHTENING

- A. Star post members that do not conform to the straightness criteria of 3.05A may be straightened.
- B. Straightening of star post members may be completed by mechanical means with loads applied perpendicular to the axis of the distortion and the load applied at the point of maximum deviation.
- C. Straightening shall not be completed by heating the members.

END OF SECTION 05542

Relocation of a Moonlight Tower

**SECTION 09900
PAINTING****PART 1 - GENERAL****1.01 DESCRIPTION**

- A. Field Painting of components of Tower affected during temporary relocation process. This includes primer, intermediate and top coatings with surface preparation as necessary.
- B. Installation of Joint Sealants in sockets as shown in the drawings.

1.02 QUALITY ASSURANCE

- A. Field Quality Control: Comply with the paint coating manufacturers requirements for interior environmental conditions including air temperature, relative humidity, and air quality.
- B. Single Source Responsibility: Provide all primer and intermediate paint coatings produced by the same manufacturer as the finish coatings.

1.03 JOB CONDITIONS

- A. Environmental Requirements
 - 1. Comply with manufacturer's recommendations as to environmental conditions under which coatings and coating systems can be applied.
 - 2. Do not apply finish in areas where dust is being generated.
 - 3. Comply with local and State regulations regarding air pollution and volatile organic compounds.
- B. Protection: Cover or otherwise protect finish work of other trades and surfaces not being painted concurrently or not to be painted.

PART 2 - PRODUCTS**2.01 MATERIALS**

- A. Acceptable Manufacturers: Paint Coatings

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1. Except as otherwise specified, materials for shop and field applied coatings shall be one of the following manufacturers: Tnemec, Kansas City, Mo. (816/483-3400).
2. Materials selected for coating systems for each type surface shall be the product of a single manufacturer.

B. Material List: Paint Coatings.

1. Shop applied Coatings:

Ferrous Primer

Description: Two component, moisture cured, zinc rich primer. High metallic zinc content, rapid curing, excellent corrosion and abrasion resistance. Conforms to SSPC-PS12.01.

Color: Reddish-Gray.

Materials: Products which meet this specification include 90-97 Tneme-Zinc by Tnemec.

Ferrous Intermediate Coat:

Description: Epoxy-polyamide coating.

Color: White

Materials: Product which meets this specification includes series 66 H-build Epoxoline by Tnemec.

Ferrous Topcoat:

Description: High build, acrylic polyurethane enamel.

Color: Light Gray.

Materials: Products which meet this specification include Series Endura-Shield III by Tnemec.

2.02. SEALANT: One part, polysulfide sealant intended for this use and exposure, and to be compatible with the top coatings specified. Manufacturers include Sonneborne and Dow.

PART 3 - EXECUTION

3.01 APPLICATION: General

A. Application of Paint: Strictly follow manufacturer's recommendations, particularly regarding surface preparation, temperature, coverage and precautions. Protect all adjacent surfaces while painting.

Relocation of a Moonlight Tower

B. Work out each coating of paint evenly and allow to dry hard before any subsequent coat is applied. Each coat of paint shall be a slightly different tint from that of the preceding coat. Finish coats shall be of color and texture specified and selected.

C. Make completed work uniform, smooth and free from runs, sags, and defective applications.

D. Application of sealant: Strictly follow manufacturer's installation instructions.

3.02 FIELD WORK

A. Touch-up any damage to shop applied finishes after tower assembly. All cast iron socket joints receiving sealant shall receive one top coat over the sealant.

END OF SECTION 09900

MOONLIGHT TOWER PARTS INVENTORY

PHASE II - GROUP _____

Part Name & No.	*Total Quantity	DELETED FROM INVENTORY	POST DISASSEMBLY	POST TESTING
<u>Z. Base</u>				
Foot (Z1)	1	1	--	--
Lower Post (Z2)	1	1	--	--
Knee-Brace Collar (Z3)	1			
Upper Post (Z4)	1			
Knee-Brace Connector (Z5)	6			
Knee-Brace Pipe (Z6)	3			
Connector Joint (Z7)	3			
Horizontal Base Pipe (Z8)	3			
Steel Strap (Z9)	1	1	--	--
Post Cap (Z10)	1			
Connector A (Z11)	3			
Connector B (Z12)	3			

* This number represents the total number of unique parts in a single fully-assembled tower.

MOONLIGHT TOWER PARTS INVENTORY, P. 2

PHASE II - GROUP _____

Part Name & No.	*Total Quantity	DELETED FROM INVENTORY	POST DISASSEMBLY	POST TESTING
B. Lower Catwalk				
Connector (B1)	3			
Horizontal Base Pipe (B2)	3			
Elbow (B3)	6			
Vertical Pipe (B4)	6			
Vertical Pipe Cap (B5)	6			
Mid-Rail Socket (B6)	6			
Horizontal Mid-Rail Pipe (B7)	6			
Upper Rail Socket (B8)	6			
Horizontal Upper Rail Pipe (B9)	6			
Platform Clamp (B10)	12			
Secure Bar (B11)	6			
Spacer Device (B12)	9			
Platform Bar (B13)	3			
Platform Bar (B14)	3			
Platform Bar (B15)	3			
Platform Bar (B16)	3			
Platform Bar (B17)	3			
Platform Bar (B18)	3			
Platform Bar (B19)	3			
Platform Bar (B20)	3			
Platform Bar (B21)	3			

* This number represents the total number of unique parts in a single fully-assembled tower.

MOONLIGHT TOWER PARTS INVENTORY, P. 3
 PHASE II - GROUP _____

Part Name & No.	*Total Quantity	DELETED FROM INVENTORY	POST DISASSEMBLY	POST TESTING
<u>C. Elevator</u>				
Clevis (C1)	1			
Rod (C2)	1	1	--	--
Rod Top Fitting (C3)	1			
Connector Arm (C4)	1			
Cable Cradle (C5)	2			
Cable Clamp (C6)	2			
Counterweight (C7)	1			
Connector (C8)	1			
Pulley Arm Pipe (C9)	2			
Pulley Holder (C10)	2			
Pulley Wheel (C11)	1			
Pulley Axle (C12)	1			
Connector (C13)	1			
Connector (C14)	1			
Cable Cradle (C15)	1			
Cable Connector Cap (C16)	1			
Pipe (C17)	1			
Connector (C18)	1			
Six-Hole Socket (C19)	1			
Pipe Segment (C20)	2			
Joint Sleeve for Braking Cradle (C21)	2			

* This number represents the total number of unique parts in a single fully-assembled tower.

MOONLIGHT TOWER PARTS INVENTORY, P. 4

PHASE II - GROUP _____

Part Name & No.	*Total Quantity	DELETED FROM INVENTORY	POST DISASSEMBLY	POST TESTING
Pipe Segment (C22)	2			
Elbow (C23)	6			
Braking Cradle (C24)	2			
Brake Pad (C25)	2			
Fixed Brake Pad (C26)	2			
Brake Arm (C27)	2			
Pipe (C28)	4			
Platform Clamp Bar (C29)	4			
Platform (C30)	2			
Vertical Rail-Pipe (C31)	4			
Steel Strap (C32)	1			
Mid-Rail Joint (C33)	8			
Top-Rail Joint (C34)	4			
Horizontal Mid-Rail Pipe (C35)	6			
Horizontal Top-Rail Pipe (C36)	6			
Vertical Lift Frame Pipe (C37)	2			
Lift Frame Connector (C38)	2			
Cable Sleeve (C39)	2			
Horizontal Lift Frame Pipe (C40)	1			
Pipe Ends (C41)	2			
Cable Eye (C42)	1			
Cable Cradle (C43)	1			
Upper Arm (C44)	1			

* This number represents the total number of unique parts in a single fully-assembled tower.

MOONLIGHT TOWER PARTS INVENTORY, P. 5

PHASE II - GROUP _____

Part Name & No.	*Total Quantity	DELETED FROM INVENTORY	POST DISASSEMBLY	POST TESTING
Cable Cradle (C45)	2			
Connector (C46)	2			
Pulley Arm Pipe (C47)	2			
Pulley Holder (C49)	2			
Upper Pulley (C50)	1			
Pulley Axle (C51)	1			
Upper Counterweight (C52)	1			
Cable Cradle (C53)	1			

* This number represents the total number of unique parts in a single fully-assembled tower.

MOONLIGHT TOWER PARTS INVENTORY, P. 6

PHASE II - GROUP _____

Part Name & No.	*Total Quantity	DELETED FROM INVENTORY	POST DISASSEMBLY	POST TESTING
<u>D. Units</u>				
Socket - Type A (D1)	3			
Clevis (D2)	192	192	--	--
Diagonal Rod (D3)	192	192	--	--
Tension Ring (D4)	48			
Step (D5)	96			
Step Wedge (D6)	96	96	--	--
Socket - Type B (D7)	27			
Socket - Type C (D8)	3			
Socket - Type D (D9)	15			
Socket - Type E (D10)	3			
Vertical Star Post 2-1/2" (D11)	30			
Vertical Star Post 2" (D12)	18			
Horizontal Star Post 2" (D13)	33			
Horizontal Star Post 1-1/2" (D14)	18			

* This number represents the total number of unique parts in a single fully-assembled tower.

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MOONLIGHT TOWER PARTS INVENTORY, P. 7

PHASE II - GROUP _____

Part Name & No.	*Total Quantity	DELETED FROM INVENTORY	POST DISASSEMBLY	POST TESTING
<u>E. Upper Catwalk</u>				
Connector Pipe (E1)	3			
Yoke Connector (E2)	3			
Horizontal Base Pipe (E3)	3			
Elbow (E4)	6			
Vertical Pipe (E5)	6			
Vertical Pipe Cap (E6)	6			
Mid-Rail Socket (E7)	6			
Horizontal Mid-Rail Pipe (E8)	6			
Upper-Rail Socket (E9)	6			
Horizontal Upper Rail Pipe (E10)	6			
Platform Clamp (E11)	12			
Secure Bar (E12)	6			
Spacer Device (E13)	9			
Platform Bar (E14)	3			
Platform Bar (E15)	3			
Platform Bar (E16)	3			
Platform Bar (E17)	3			
Platform Bar (E18)	3			
Platform Bar (E19)	3			
Platform Bar (E20)	3			
Platform Bar (E21)	3			
Platform Bar (E22)	3			

* This number represents the total number of unique parts in a single fully-assembled tower.

MOONLIGHT TOWER PARTS INVENTORY, P. 8
 PHASE II - GROUP _____

Part Name & No.	*Total Quantity	DELETED FROM INVENTORY	POST DISASSEMBLY	POST TESTING
<u>Q. Candelabra</u>				
Connector (Q1)	3	3	--	--
Connector (Q2)	4			
Diagonal Pipe (Q3)	2			
Connector (Q4)	2			
Horizontal Pipe (Q5)	2			
Post Bottom (Q6)	1			
Lower Post (Q7)	1	1	--	--
Connector (Q8)	1	1	--	--
Fixture Pipe Connector Ring (Q10)	1			
Fixture Pipe (Q11)	6			
Fixture Connection (Q12)	6			
Upper Post Pipe (Q13)	1	1	--	--
Post Cap (Q14)	1			
Upper Clevis (Q15)	6			
Diagonal Support Rod (Q16)	6	6	--	--
Lower Clevis (Q17)	6			

* This number represents the total number of unique parts in a single fully-assembled tower.

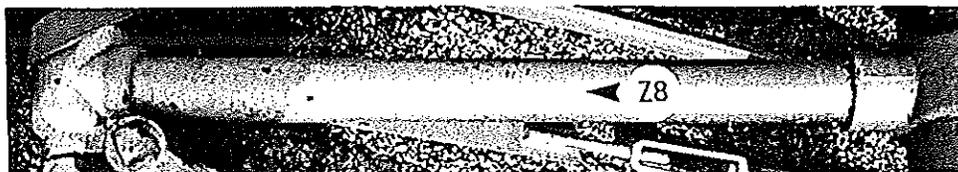
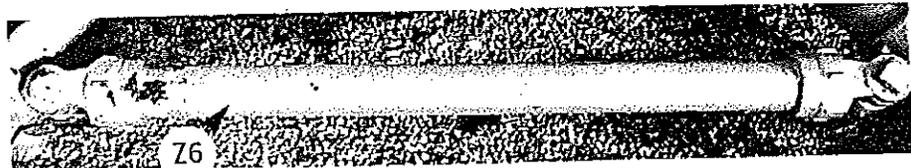
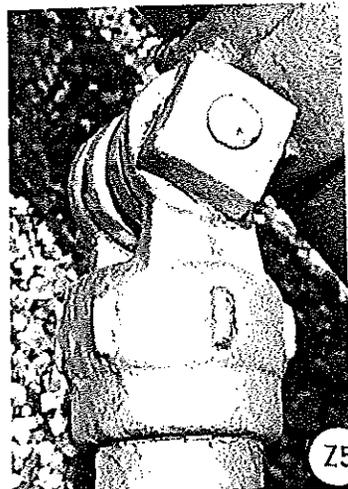
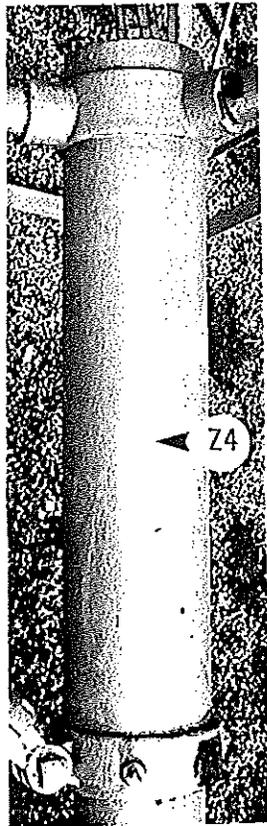
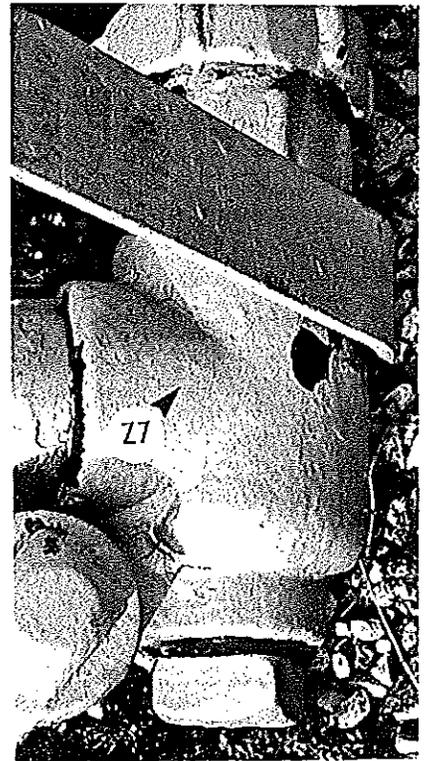
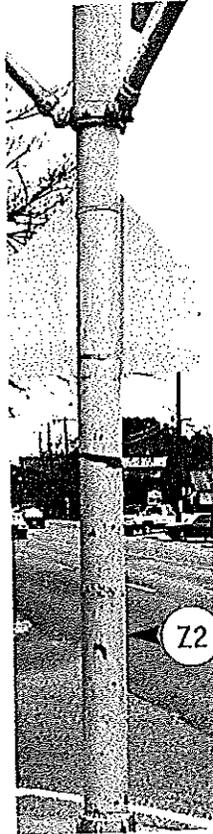
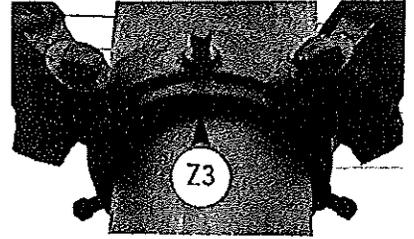
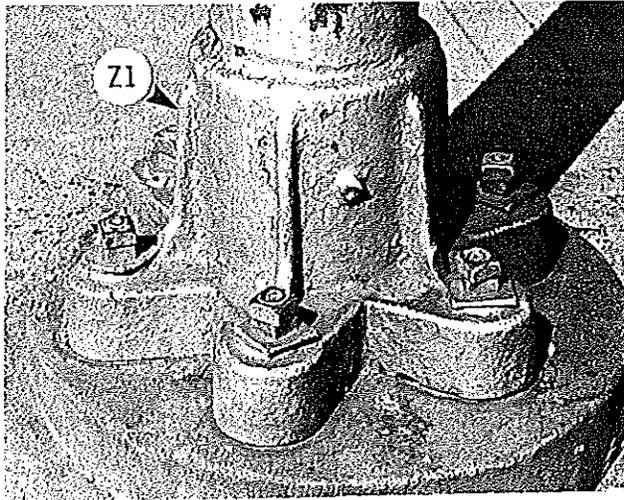
MOONLIGHT TOWER PARTS INVENTORY, P. 9

PHASE II - GROUP _____

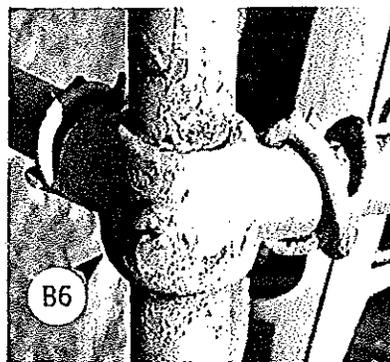
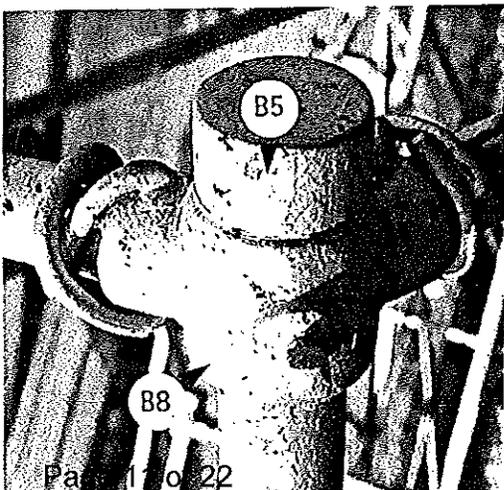
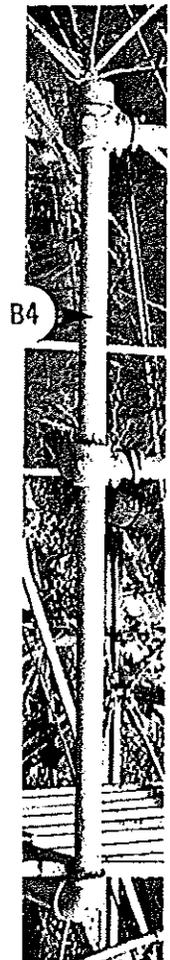
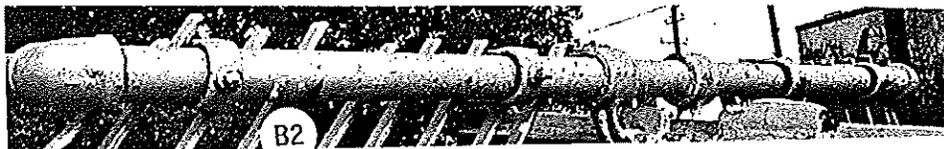
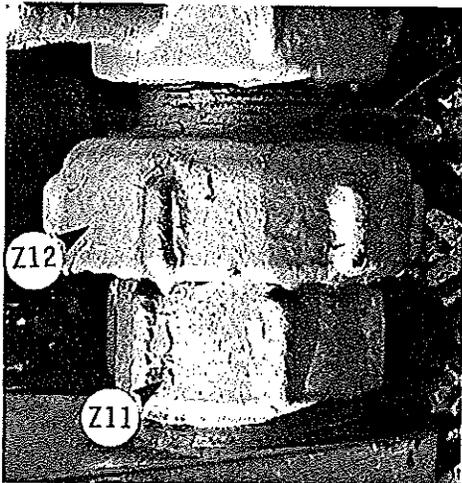
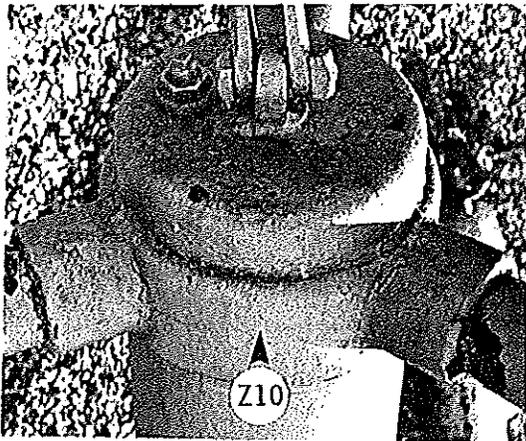
Part Name & No.	*Total Quantity	DELETED FROM INVENTORY	POST DISASSEMBLY	POST TESTING
<u>G. Anchor Post (single)</u>				
Post (G1)	1	1	--	--
Guy-Wire Connector Ring (G2)	2			
Turnbuckle w/Eye Bolt (G4)	2	2	--	--
Eye Bolt (G5)	2	2	--	--
Cable Cradle (G6)	2	2	--	--
Cable Clamp (G7)	2	2	--	--

* This number represents the total number of unique parts in a single fully-assembled tower.

MOONLIGHT TOWER PARTS INVENTORY

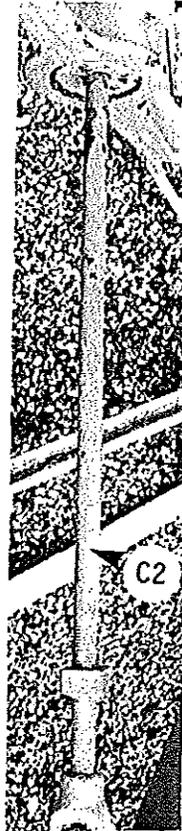
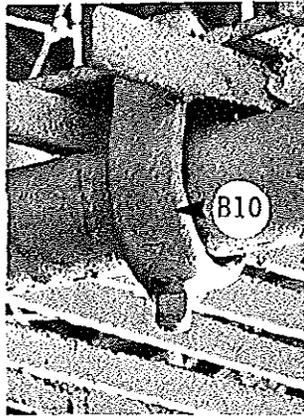
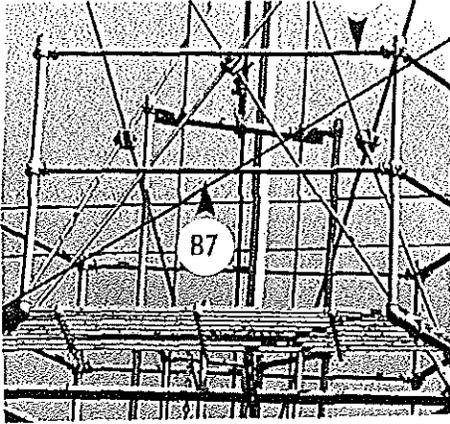


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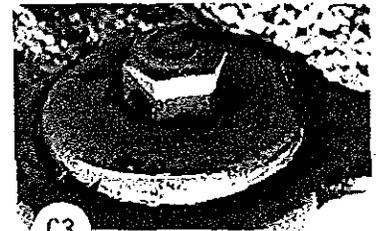
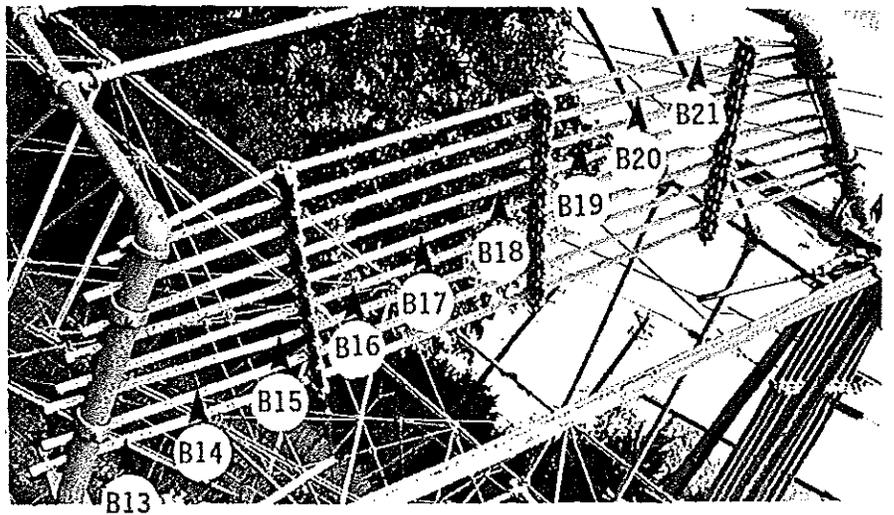


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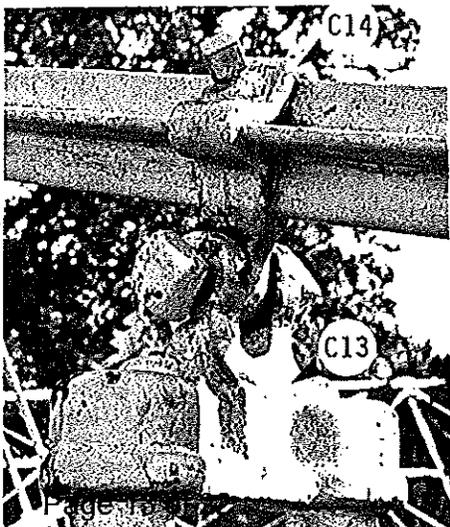
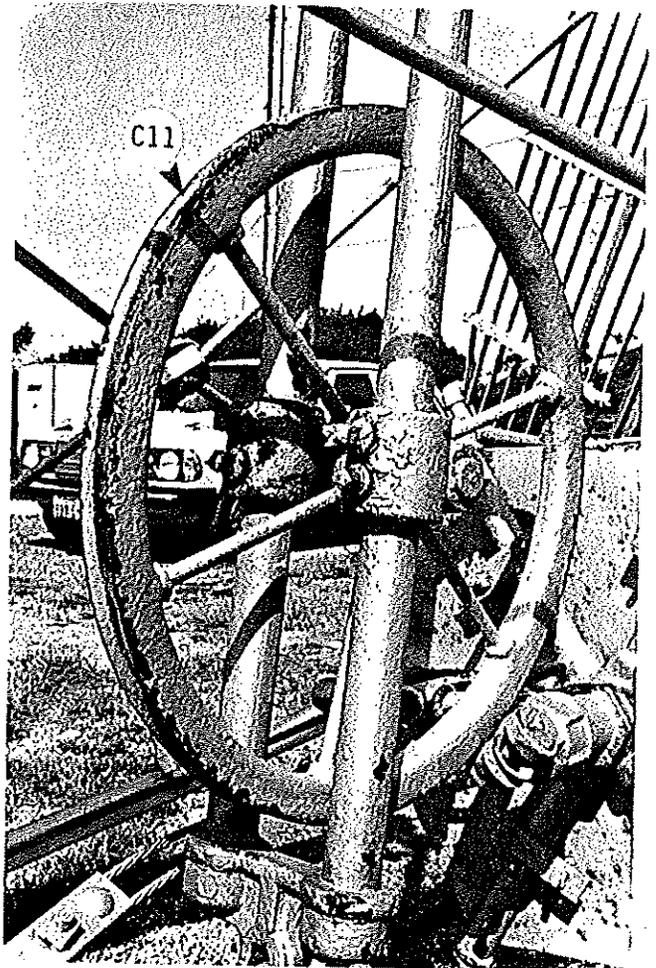
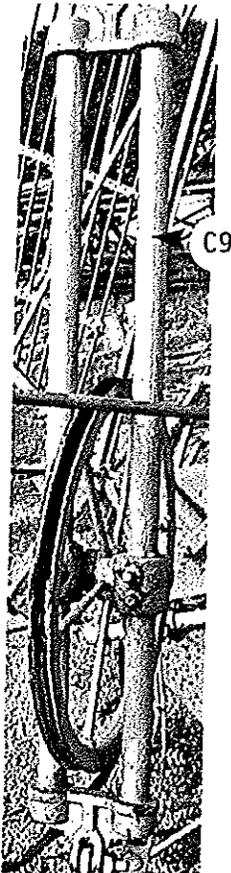
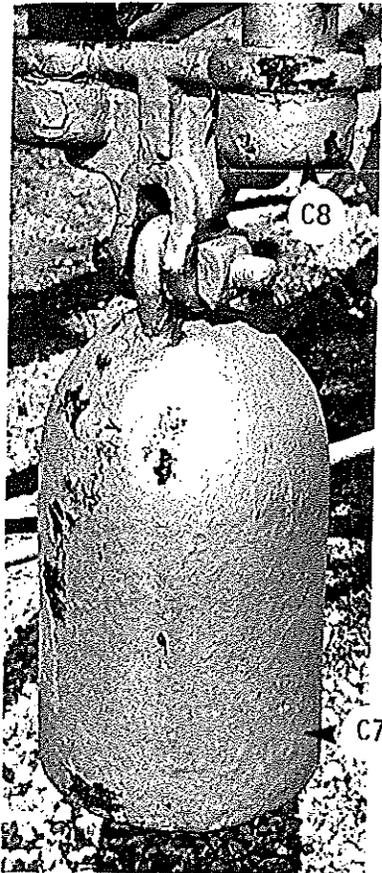
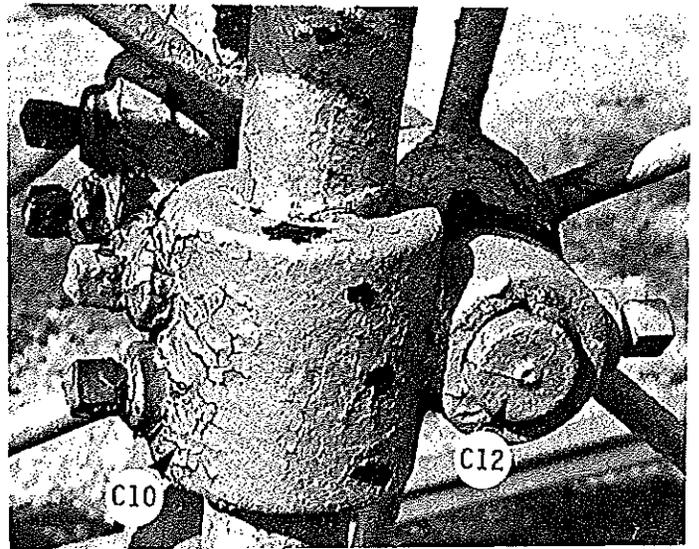
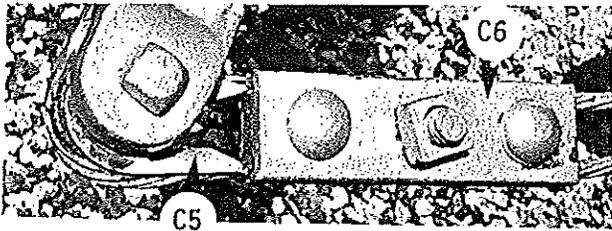
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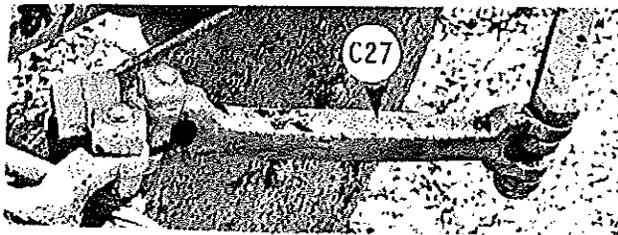
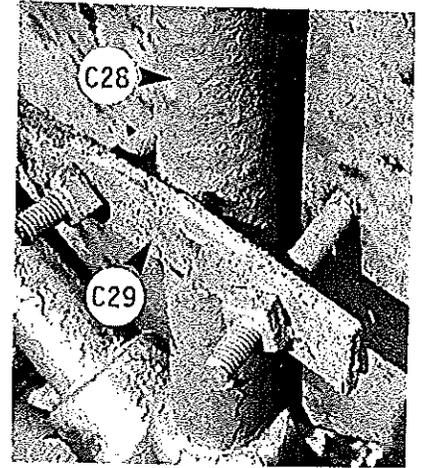
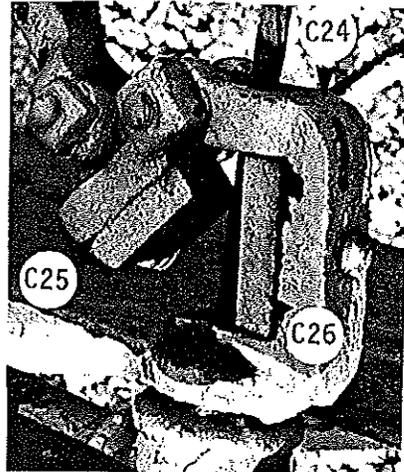
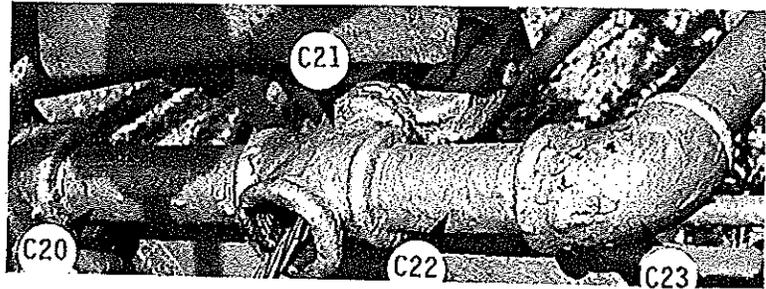
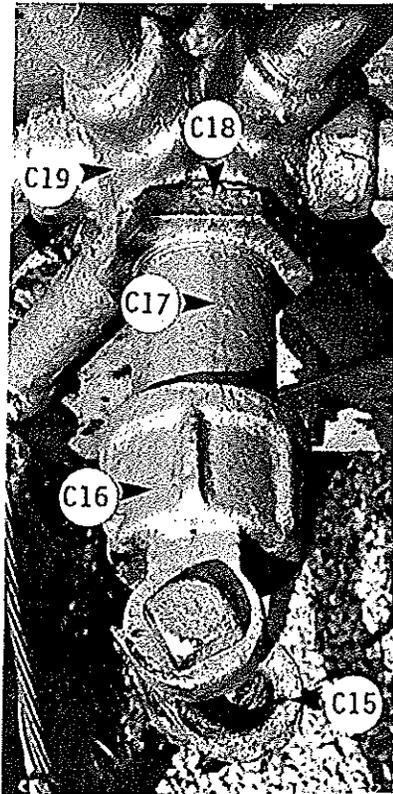
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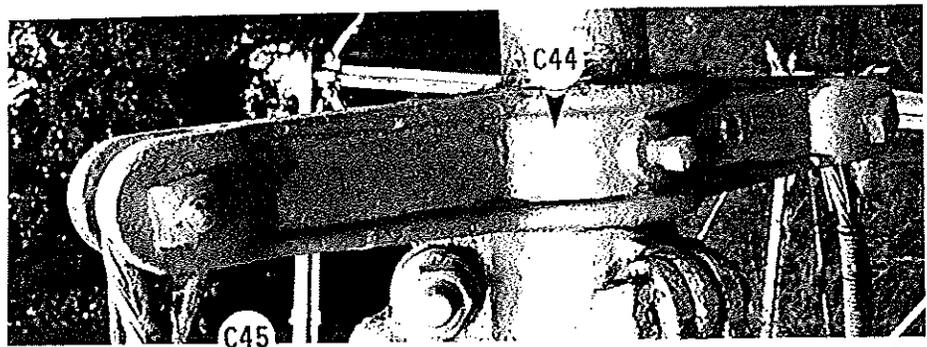
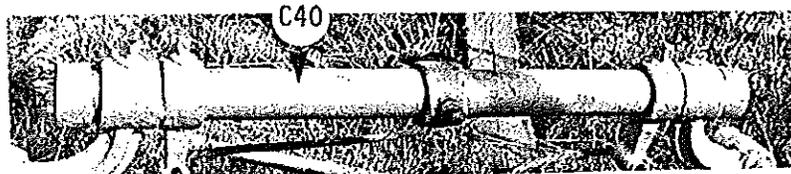
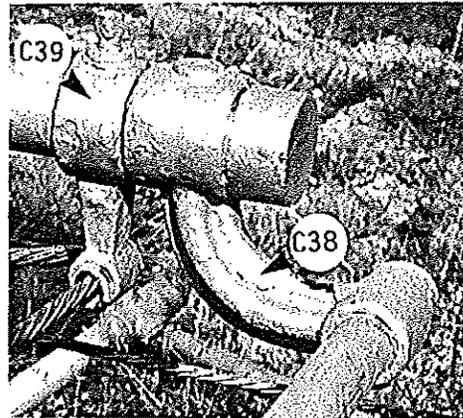
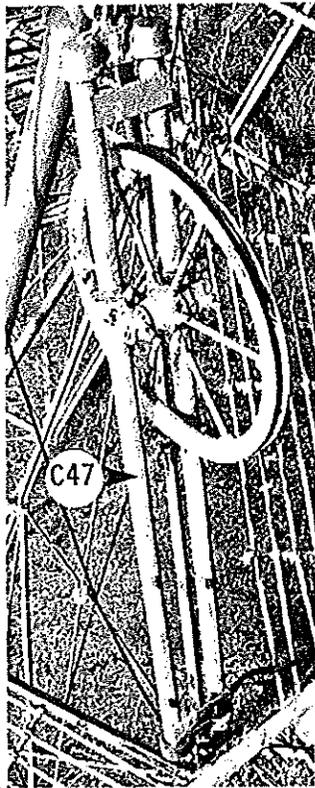
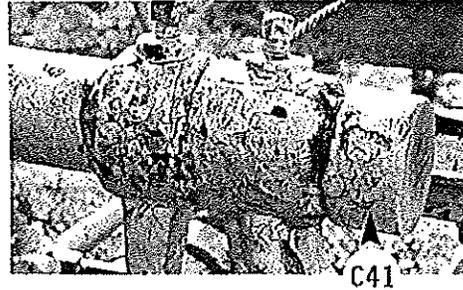
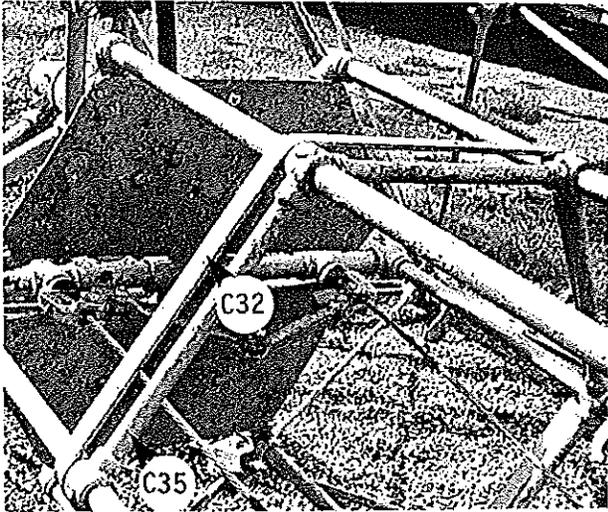
MOONLIGHT TOWER PARTS INVENTORY



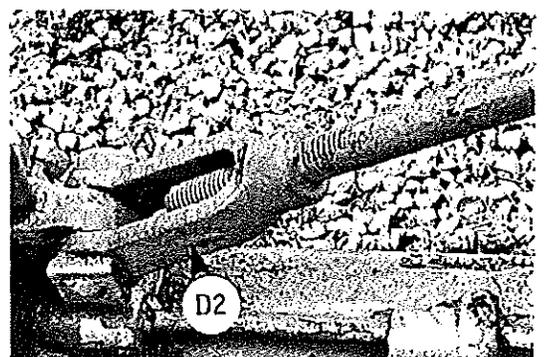
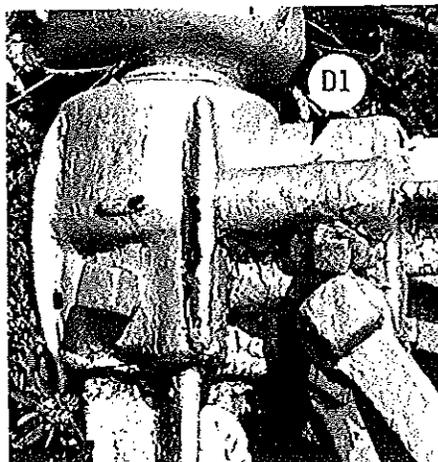
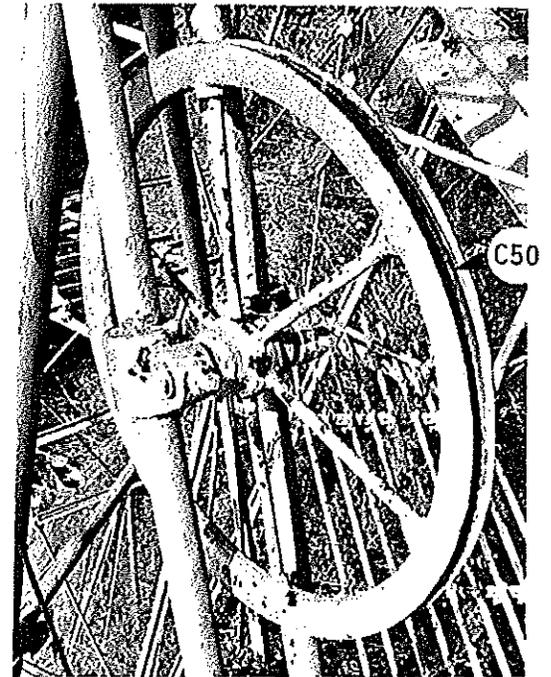
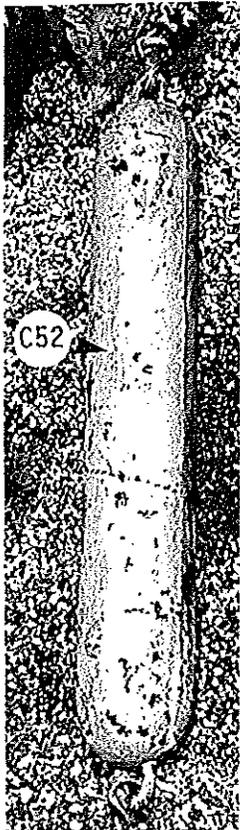
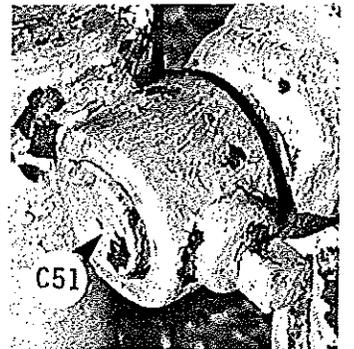
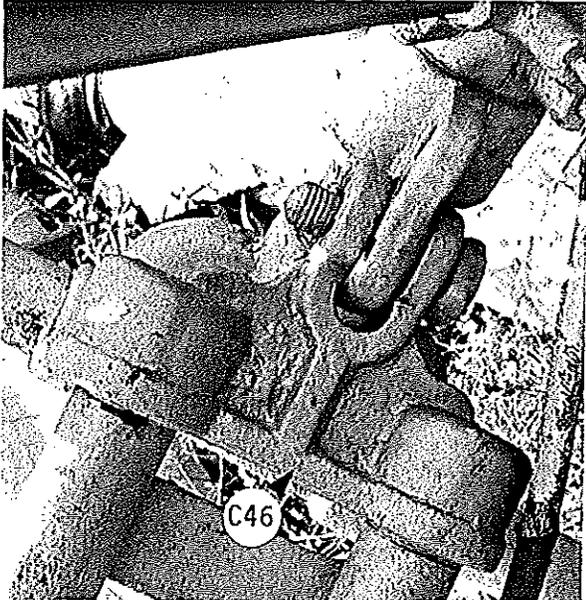
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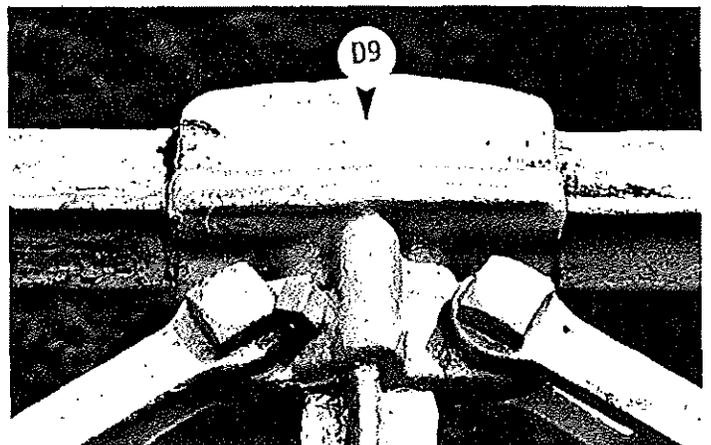
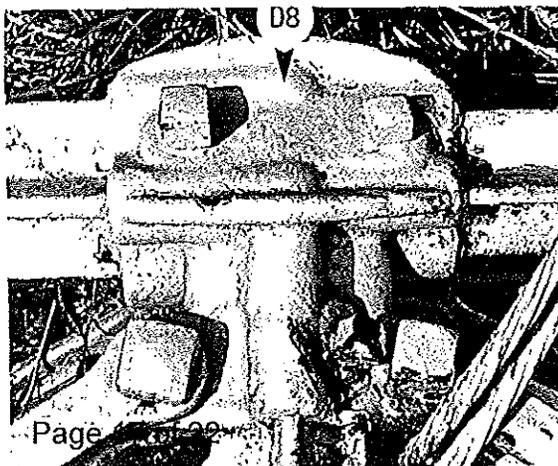
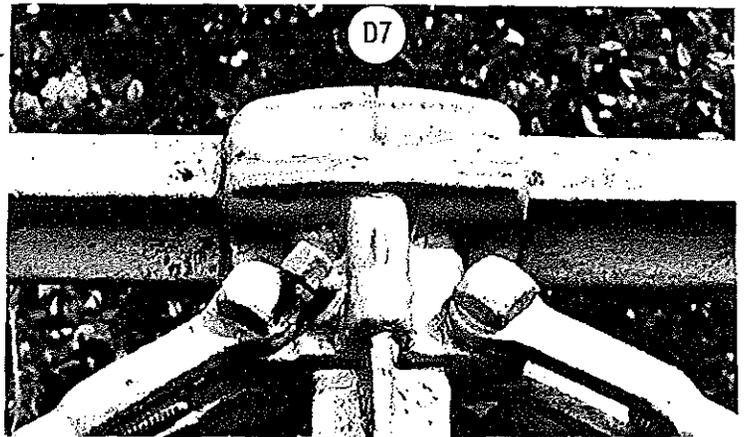
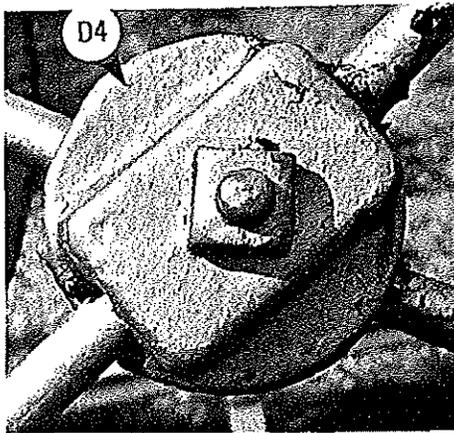
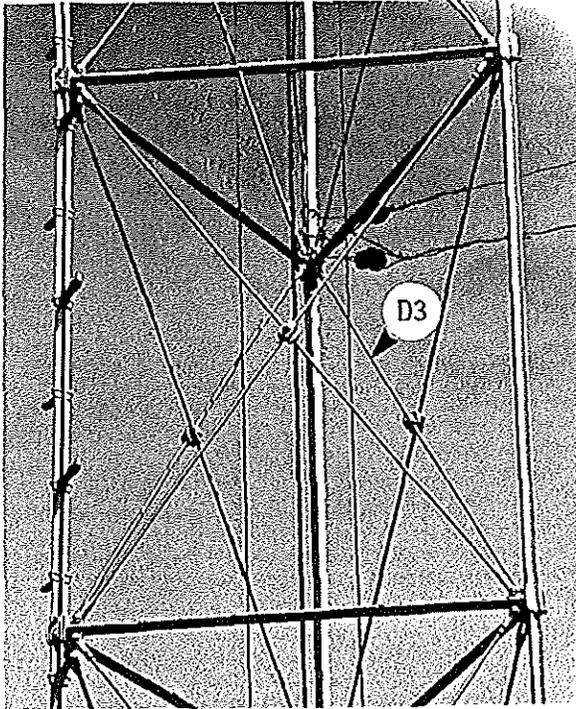
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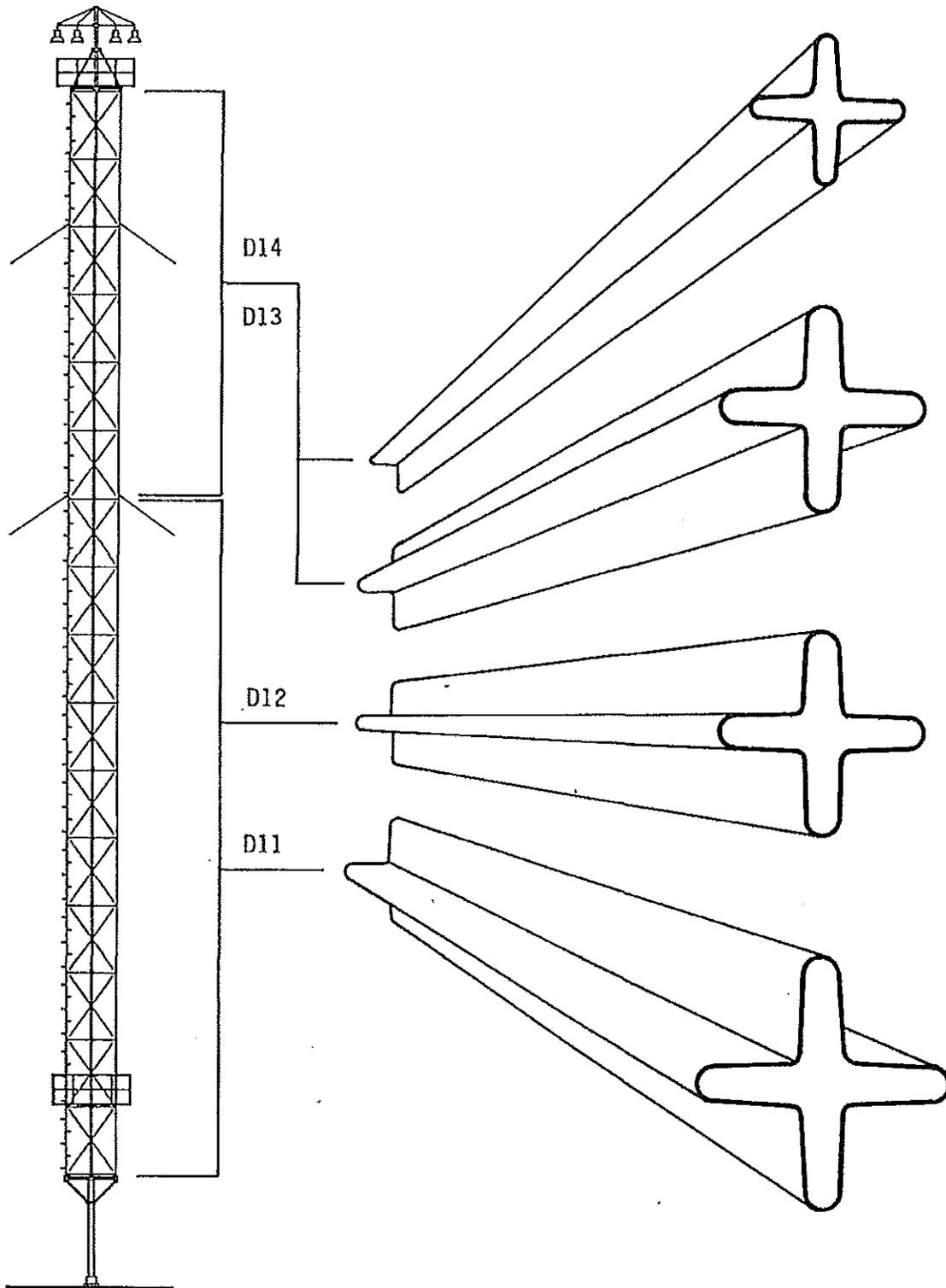
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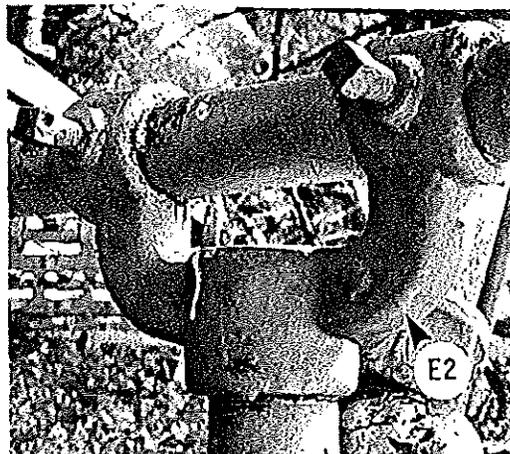
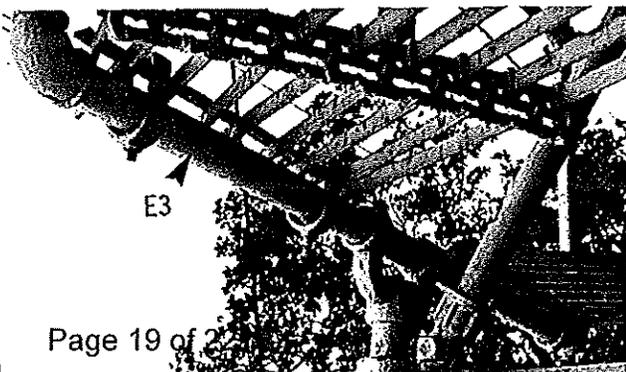
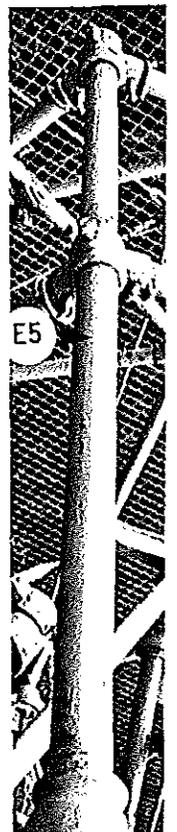
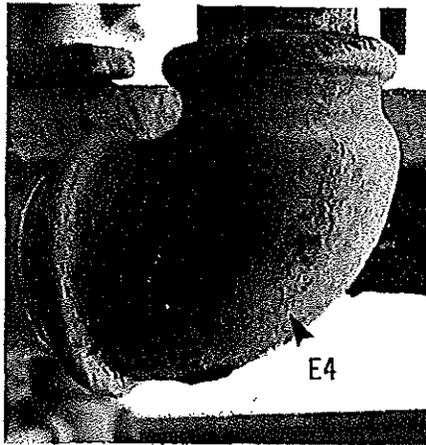
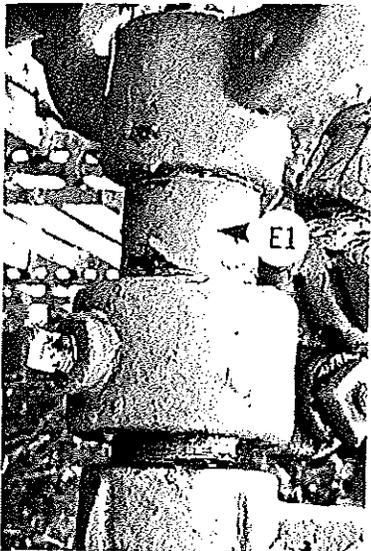
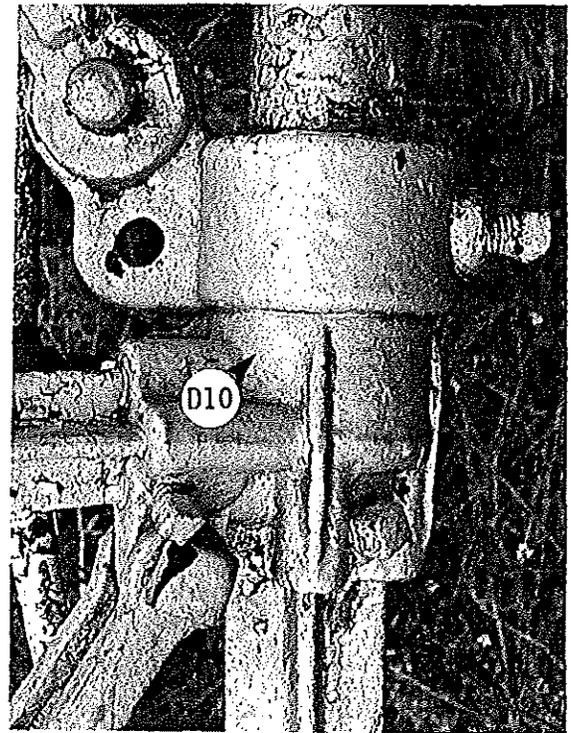
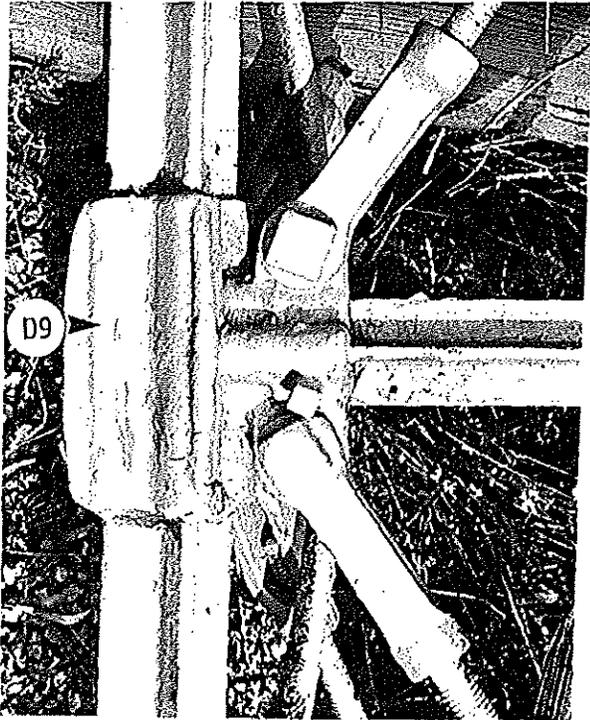
MOONLIGHT TOWER PARTS INVENTORY



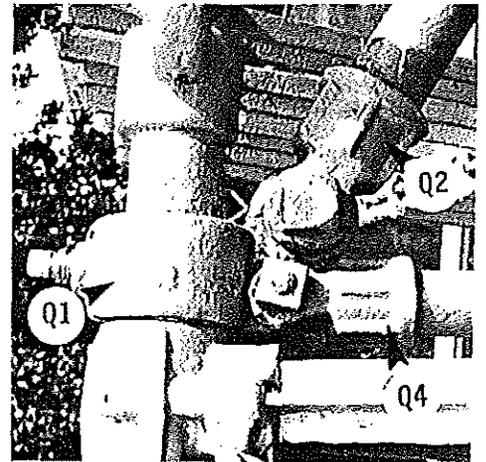
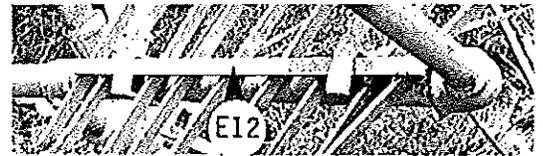
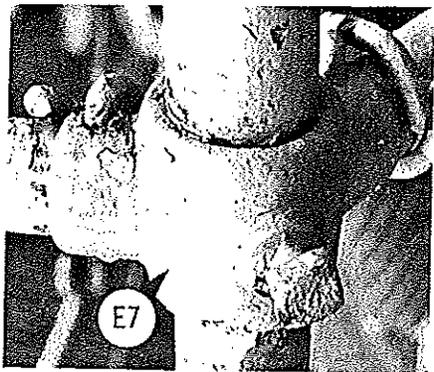
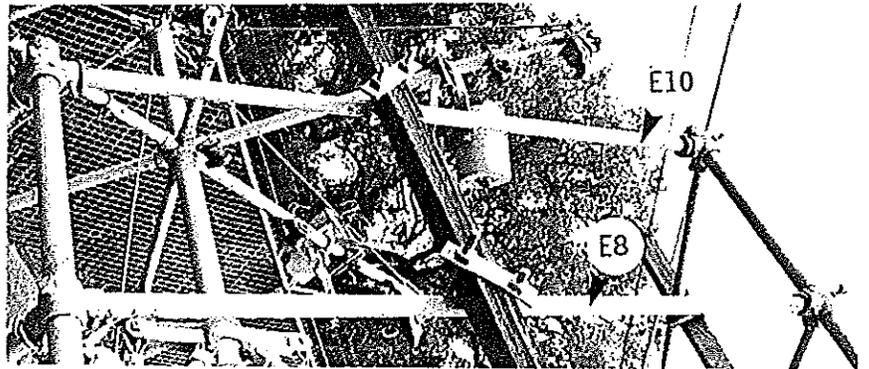
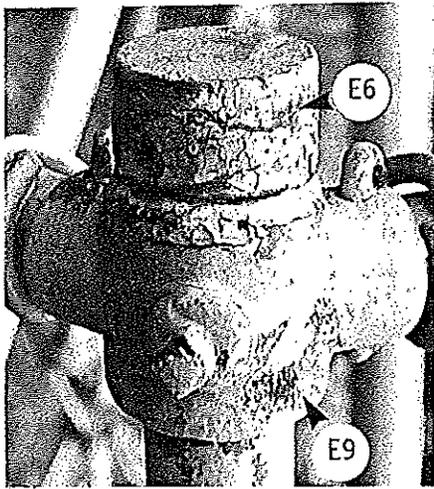
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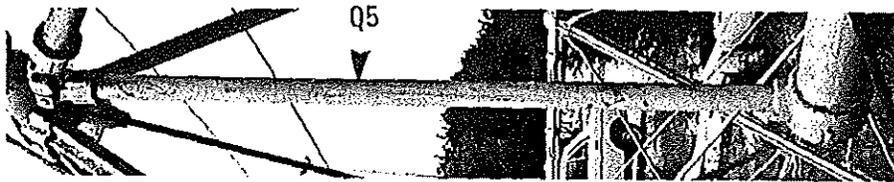
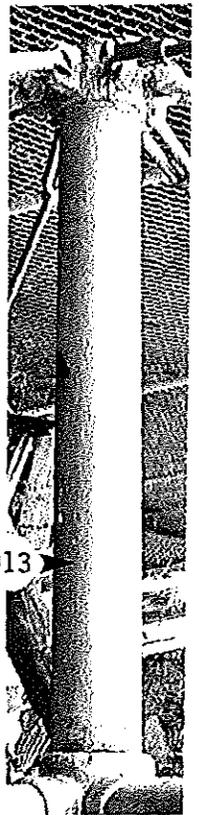
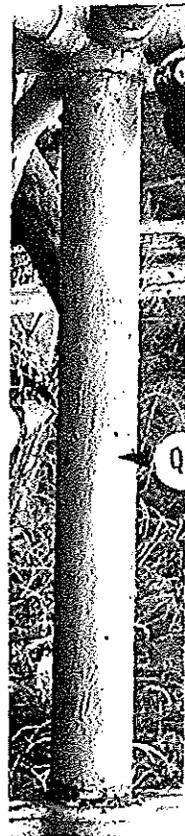
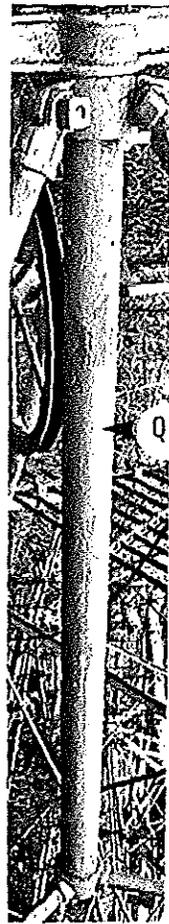
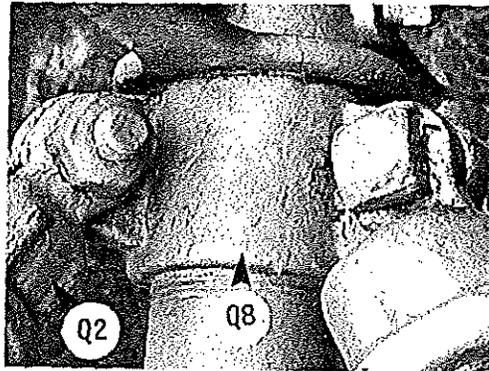
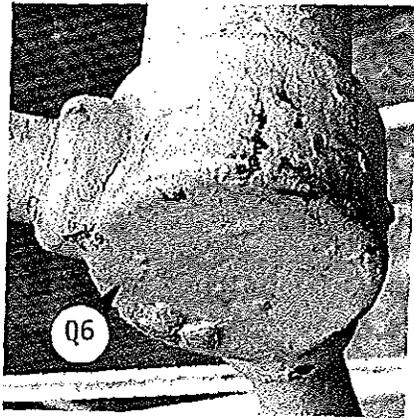
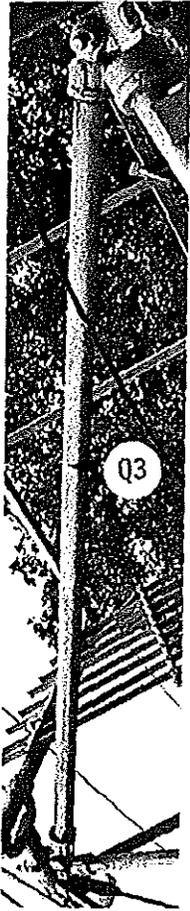
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