

By

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This paper describes a portable 10-m mast that can be used for supporting vertical arrays of meteorological instruments. The mast is designed to be used over snow as well as on bare ground or ice, and it is easily adjusted to be plumb over uneven or sloping surfaces.

Constructed of aluminum alloy 6061-T6, the support base weighs 43 kg, and the mast with braces attached weighs 42 kg. When disconnected from the base, the pole and braces fold together into a unit 5.5 m long (Figure 1). The base channels disconnect at their intersection. Hinged attachments of the mast and lateral braces to the base allow raising and lowering the fully-extended mast. The downwind brace is used to control this operation. Instruments are mounted on arms that clamp to the pole with welder grips, allowing rapid height adjustments or removal. The mast can be completely assembled and erected within a few minutes by one person.

Although this design is free-standing in winds up to 15 m.s^{-1} , for stability in stronger winds, the base is anchored by rubber shock cords to ice screws or steel rods driven at the three ends of the base. The only failure experienced during 6 years of use consisted of an outward bending of the rear brace during a wind gust of 45 m.s^{-1} . The mast can be moved over short distances without disassembly or removal of instruments. One person can pull the mast over snow when skis are placed under the ends of the base cross-member (Figure 2). Fabrication Plans are provided in Figures 3-5.

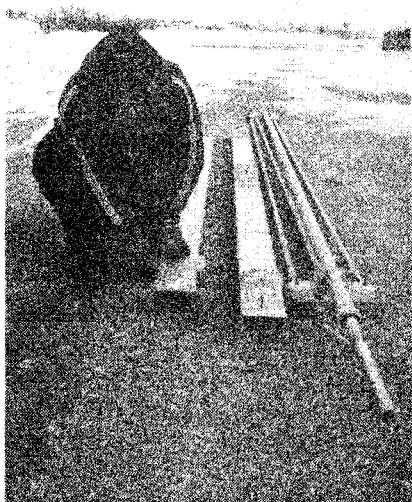


Figure 1. Mast disassembled for transporting.

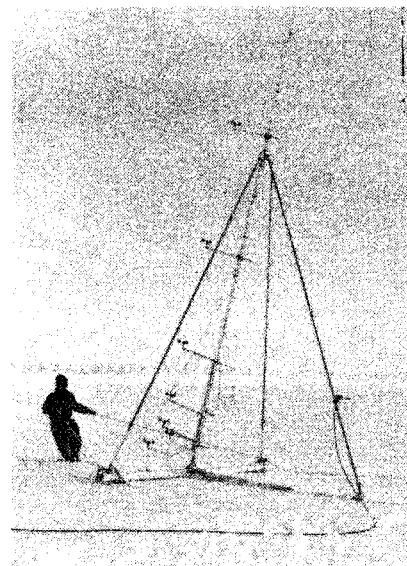


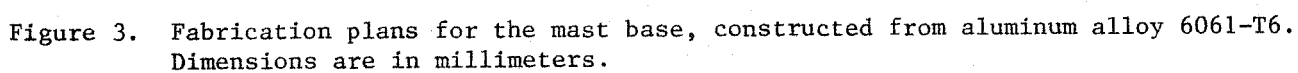
Figure 2. Moving the mast with skis placed under the base.

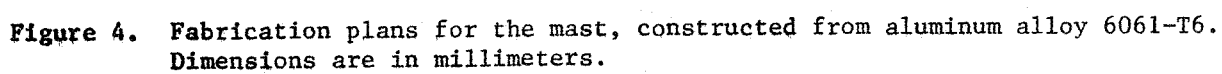
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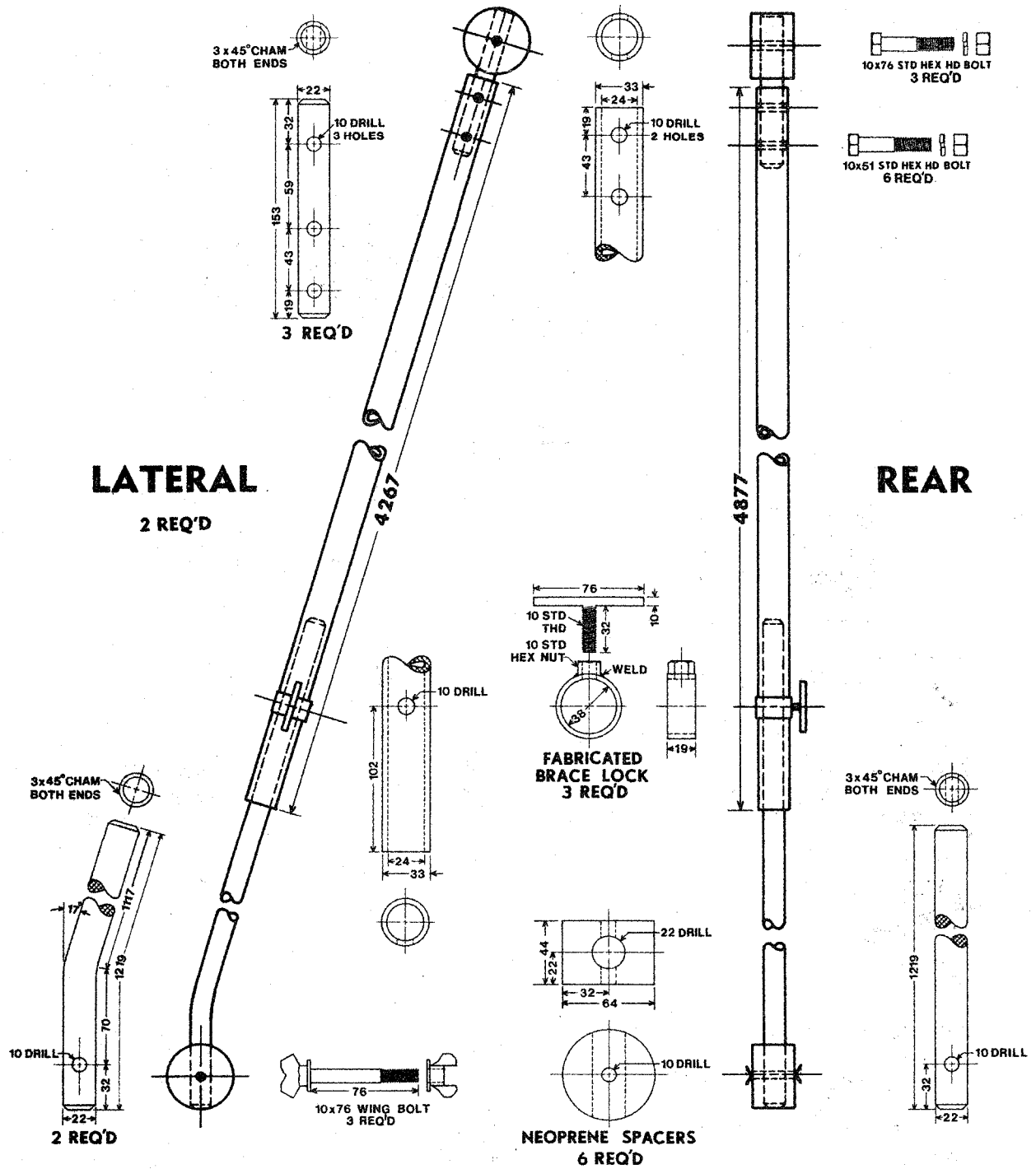


Figure 5. Fabrication plans for the mast braces, constructed from aluminum alloy 6061-T6. Dimensions are in millimeters.