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# Aqua-Trike Conversion Kit

Tim L. Mooneyhan

*Indiana University - Purdue University Fort Wayne*

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AQUA-TRIKE CONVERSION KIT

Senior Project Final Report  
Mechanical Engineering Technology 497

Prepared For  
Professor Donald J. McAleece  
Department of Mechanical Engineering Technology  
Purdue University at Fort Wayne

By  
Tim L. Mooneyhan  
April 5, 1986

Descriptive Abstract

The Aqua-Trike Conversion Kit will convert a three wheel bicycle into a "paddle boat," allowing the user another means for enjoying the water. Low cost, convenient, recreational uses, and easy attachment make the kit an ideal option. This report presents the technical plan used for designing, fabricating, testing and costing required for the conversion kit. Also, included is a bibliography and Appendix, which contains calculations, drawings, component specifications and data sheets.

### Informative Abstract

This conversion kit will allow a three wheel bicycle to be used as a type of "paddle boat." The kit itself will be constructed of Mistafroth S8137/H8439 and Duro 2" thickness foam insulation sheeting. These two types of foams have a density of 1.8 and a 0% absorption rate and rated to support 60.7lbs./cubic foot. The frame for the front skis are 6063-T5 Aluminum tubing with a yield strength of 31,000 psi, allowing the conversion kit to be lightweight (23 lbs), rust-free, and stronger than necessary (safety factor of 2). The paddles are Acrylic Polyurethane 1/4" x 6" with a 90 degree bend. The yield strength of the plastic is 30,000 psi. The holding wraps are 3/16" x 3' elastic Bunji Cord and has a tensil strength o 20,000 psi. All bolts and all-thread are S.A.E. cold rolled 1020 steel and has a tensil strength of 73,000 psi. Fastening the kit to the bicycle allows the user to ride directly off land and into water. Three wheel bicycles have a maximum weight capacity of 350 lbs. I have designed the kit to safely support a total of 540 pounds, giving a 1.98 safety factor. The testing consisted of putting the bicycle in water and having a 220 lb. person paddle through the water and rocking the kit as much as possible to determine the stability of the kit. The kit would rock only 18 degrees side to side and determined safe. To overturn the kit, a side force of 400 lb. was needed, much more than actual side force of 150 lb. The total designer cost, because of donated nuts, screws, and Aluminum, was \$40.50, well under the estimated \$100.00. Mass produced, the kit would cost between \$60.00 to \$70.00. The final date of completion was April 1, 1986.

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