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# POPULAR LOG FLUME RIDE MAKES A SPLASH WITH MACHINED PPS

## HOW AIP REDUCED A WATER RIDE'S OVERHAULS ROUGHLY 25X

### Situation

Nearly 300 million people visit theme parks in the United States every year, and no state is better known for their amusement parks than Florida.

When a popular ride experiences downtime, however, the negative impact on guest satisfaction is immediate. If a visitor expects a certain attraction, having that ride closed down lowers the perceived value of their park experience.

This was what one Florida theme park learned after unveiling an exciting log flume coaster, only to discover the thrilling water ride required almost nightly maintenance and part replacement. An innovative AIP solution was needed to reduce downtime and keep the ride sustainable.

### Challenge

The client had worked with AIP Precision Machining previously on other projects. Knowing AIP's reputation for "innovative solutions," the theme park contacted them about the part issue they were experiencing. Specifically, they needed a new material for their wheel bushings.

The log flume's passenger carts originally used bronze bushings due to their good wear properties. However, the speed and load of the carts generated a great deal of heat when the ride would plunge into its steep, vertical drop. The moment each cart hit the cool water below, the wheel bushings would suddenly experience "shock cooling" damage.

Between this and the constant exposure to chemicals in the water (such as chlorine), the bronze bushings faced a very short life cycle. A new material was needed that could weather the ride's varying speeds, temperatures and environments without compromising performance.

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## Solution

Using their decades of precision machining expertise, AIP Precision Machining selected Quadrant's BG1326: a bearing grade of the high-performance thermoplastic PPS. The thermoplastic Torlon was also briefly considered, but ultimately rejected due to how the material absorbed moisture.

PPS, on the other hand, had a low moisture absorption rate and could be machined to the exact tolerances necessary for clearing and shaft. With low-wear, high temperature stability and a low coefficient of friction, the chosen PPS grade proved to be an excellent fit for the log flume's wheel bushings.

AIP worked diligently with the ride engineers to ensure the bushings were built to the exact specifications of the water ride. Due to the grade of PPS chosen, the only methods available for manufacturing the bushings were machining or injection molding. By precision machining the bushings instead, the components could meet the precise tolerances and finishes demanded by the speed and load of the log flume.

Machining was also more cost-effective because of the volume of wheel bushings being manufactured. A single log flume ride could use a few hundred bushings across its passenger carts, but that amount would be too low to pay back the high initial costs of injection molding.

## Resolution

AIP's established relationship with Quadrant gave the client access to the supplier's high-quality PPS grade for their wheel bushings. A massive benefit of the machined PPS bushings was the reduction in ride downtime. The previous bronze bushings required roughly **25x the overhauls** of the new PPS bushings. Overall, the change in materials not only saved on maintenance and inventory costs, but improved guest satisfaction with the increase in uptime.

Another effect of the PPS bushings was that they removed the potential for grease to affect seals or chemicals in the water. As a self-lubricating plastic, PPS removed the need for nightly greasing the wheel bushings. The lower energy cost of the PPS material additionally made for a more environmentally friendly and efficient design.

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From concept to completion,  
**AIP can help find the solution to your challenge.**

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