WHITE PAPER:

Push/Pull Testing

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Ergonomics is one of today's biggest buzzwords when it comes to material handling products and with good reason. Every year, large sums of money are lost due to employee downtime and injuries sustained due to in-efficient material handling practices. In recent years companies have begun to pay more and more attention to the amount of difficulty their employees have in moving goods around facilities in an effort to protect both their employee's health and the company's bottom line. At RWM, we understand this need and created a specialized piece of equipment to test our caster and wheel products in order to help our customers select the correct caster and wheel combination for each application insuring the best rolling product for each and every potential use.

The RWM Automated Push/Pull Test Machine allows RWM Engineering and Quality Assurance staff to determine the amount of force required to push or pull a loaded cart equipped with a particular set of four casters. The machine uses a test cart that straddles a set of guide rails (to keep the cart from wandering left or right) and is pulled by a circuit of chain that is driven by a variable speed electric motor. At the point where the chain attaches to the cart, an S-Type Load Cell makes the coupling and allows the operator to take readings via a digital readout as to how much force is required to initially move and further sustain movement of the cart. The chain drive set up allows the cart to move in either direction and therefore simulate being pushed or pulled. The floor beneath the cart has been coated with a special polyurethane coating to simulate flooring conditions in many of today's modern factories. The test itself consists of several parts. For each test condition, seven test runs are made. From the seven values, the high and the low value are dropped and the rest averaged. These seven runs are performed with three caster orientations (simulating swivel caster orientations that would be encountered in the field) and for both a pull and a push movement. On top of this, each configuration is tested at four or more different loads. Table 1 below shows the four loads the test is typically performed with. Loads can vary depending from application to application and can be easily changed for each specific test.

Figure 1: RWM Automated Push/Pull Test Machine

As mentioned to the right, there are three caster configurations used during the test. These configurations are zero degree orientation (Straight line), a 90 degree orientation with the casters in the same direction, and a 90 degree orientation with the casters in opposing directions. Figures 2 and 3 below illustrate the second and third orientations.

	TOTAL LOAD	CART LOAD-OUT
Load 1	500 lbs	Empty Cart
Load 2	1000 lbs	Cart plus two 250 lb weights
Load 3	1500 lbs	Cart plus four 250 lb weights
Load 4	2000 lbs	Cart plus six 250 lb weights

Table 1: Loading Conditions for Push/Pull Testing

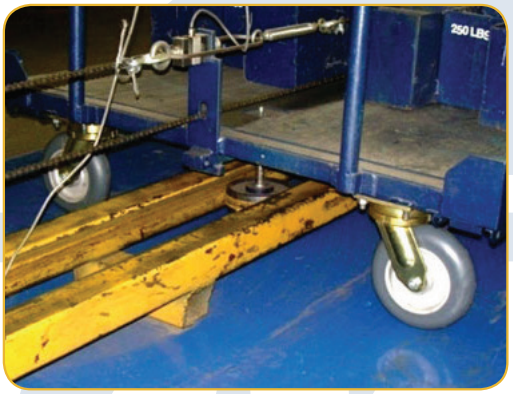

Figure 2: 90 Degrees opposed

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The primary function of the test is designed to measure the initial "breakaway" force of the cart. This, in essence, is the amount of force required to get a stationary cart moving. Typically under 2,000lbs breakaway forces should be kept under 50lbs to ensure operators can maintain comfortable cart operation throughout the shift. This setup can also be used to measure the rolling resistance of a given setup. To do this, we attach the load cell readout to a laptop computer and take data readings for ten seconds as the cart is pushed or pulled down the length of the test area. As with the breakaway test, this process is repeated several times in order to get an average reading.

This is one more way that RWM Casters Company is helping our customers get the right product for their application. If your company is interested in how the RWM Automated Push/Pull Test machine can help you find the perfect caster and wheel for your applications, feel free to contact either our sales or customer service departments for immediate attention to your application.