

Internet-Based Research of Ergonomic Equipment  
Summer 2010 Ergonomic Internship  
National Institute for Occupational Safety and Health  
Todd Ramsey, GSP  
8/16/2010

**Purpose:**

An internet search for commercially available material handling equipment with ergonomic features was conducted to determine its availability, cost, and applicability to work tasks in America's wholesale and retail trade and transportation warehousing and utilities sectors. A database of said equipment was compiled for use by NIOSH stake holders as a quick guide to ergonomic material handling equipment and its various forms.

**Scope:**

The types of equipment included in this study are load lifting, tilting, transporting, rotating, and automatic height adjustment devices that may reduce ergonomic risk to workers in the WRT and TWA sectors. All devices found having the potential to reduce ergonomic risk to workers were also included. A database of this equipment was built for use on NIOSH's website. The database is not exhaustive, but rather it is a cross-sectional sample of equipment that can be found online.

**Methods:**

This was solely an internet search, where information was gathered from online sources. Contact phone numbers and email addresses accessed from websites were used to contact vendors, whom provided additional information regarding the equipment. The search started with broad search engine queries for keywords like "ergonomic hand truck", or "material handling lift". Links for distribution websites resulting from each search were followed. Each website was thoroughly searched to find ergonomic material handling equipment. Manufacturers and brand names were noted and subsequently searched using search engines. Equipment which met the writer's subjective criteria was catalogued in a spreadsheet database.

The database includes a representative picture for each specific type of device, a listing of brands/manufacturers, a rough estimate of price, the website from which the price was quoted, and a link to the internet page where it was found. A representative sample of available machines in each category was entered. Again, this database is not exhaustive.

**Findings:**

A wide range of ergonomic material handling equipment can be located on the internet. There is an abundance of equipment distribution websites which offer varying selections of said equipment. Some websites offer online pricing and purchasing, while others refer the reader to their local dealer. Most brands have options available that allow customization. In some instances the reader may be directed to a trained consultant or salesperson who can tailor the equipment to their specific needs.

This equipment can easily be broken down into categories based on its design and function. Many manufacturers/brands produce comparable machines within these categories. The differences in equipment from one brand to another where subtle in many cases, depending on which type of device was chosen. The overall design may differ while the function is the same. The power source from one machine to the next may differ as well. Machines may be battery powered, pneumatic, spring-actuated,

or manually operated. Machines may be mobile, stationary, controlled by hand or foot. They may be available in different weight capacities or other operational parameters such as size or lift height, for example.

There were some challenges to locating this equipment. First, each website is different. All websites varied in their design, layout and usability. The logic by which a site categorized or grouped equipment was drastically different in some cases. The nomenclature used to describe equipment was also highly variable from one site to the next. This made searching equipment more difficult, however many sites were visited often, and some familiarity with each of them was gained.

Secondly, some devices originating from a common manufacturer have undergone changes to the nomenclature as well as the brand name, depending on which company is marketing the equipment. For example, company Alpha calls their machine “The Alpha Self-Leveling Platform Cart”, while company Beta will call it “The Beta Portable Lift Table”. All the while the machine is made by the same manufacturer in China. There is no mechanical difference in the two, only a change in branding and naming.

Lastly, websites differed in the variety and types of equipment they carry. Some websites may be geared toward logistics and warehousing, while another may specialize purely in material handling, and yet another may be a very large site that carries almost a million products (Grainger for example). The more specialized sites were typically easier to navigate, but may not contain the spectrum of equipment like that of a very large site, conversely the very large site that contains lots of equipment may be more difficult to navigate. Well designed large websites were most convenient for use in this project, as they include a wide range of equipment in one place.

The most well designed, and most impressive websites contained pictures and videos of equipment. Although the videos were used primarily as advertisement, they still allowed customers to see how the device operates, as well as its application to some extent. Other helpful features found on the better websites were online pricing, listings of all available options for each device, and the capability to order online. Websites that did not have some or any of these features nearly always provided a customer service phone number where a salesperson could be reached. Once contacted, the salesperson learns the needs of the customer, and provides services accordingly.

There were many manufacturers’ websites that contained detailed information and specifications on their equipment. These sites rarely contained pricing. Instead, they offered contact information for a representative who would learn the customer’s geographic location, and then direct them to a local dealer. A useful feature found on this type of site was the dealer locator search, where the customer could enter their zip code and a listing of dealers for that area was shown.

### **Discussion:**

A plethora of different ergonomic material handling equipment was discovered using the World Wide Web, however, this investigator found shortcomings in the design of certain devices. It is not that the mechanical integrity or function of any device was flawed, but that some lacked useful features

present on other machines. If the manufacturer were to simply combine these features into one machine, then a more useful piece of equipment would have been created. The figure below illustrates combinations of features by way of addition of their features.

**WISH LIST:**

**Description:** Self-leveling (computer and scale controlled), power driven, high lift powered pallet mover



---

**Description:** Power driven self-leveling cart



**OR**



**OR**

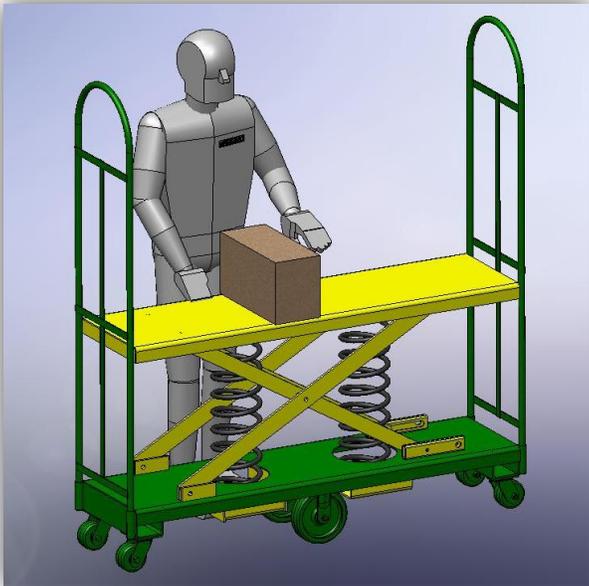


**Description:** Self-leveling powered portable load positioner

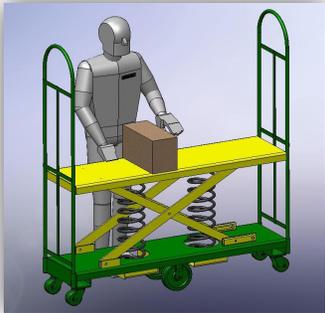


---

**Description:** Self-leveling u-boat cart



**Description:** Power-driven self-leveling U-boat cart



+



**Description:** Power-drive pallet tilter



+



**Description:** Self leveling –powered rotation carousel



272986

+



As can be gathered from these illustrations, the technology exists to allow the creation of more versatile equipment, yet the features shown here rarely culminate in the form of a single machine. Some features can be added to devices as options at an additional cost, but it is not always obvious to the customer that such options exist since typically only the base model machine is advertised using a picture. A picture of the base-level machine accompanied by a brief description and a list of options is standard on most websites. Sometimes hidden within those lists are items of great ergonomic utility, which can be easily overlooked.

Other times the combinations simply do not exist. An example of this is the absence of a power-driven self-leveling cart. A power driven cart reduces the force required of the user to move the load, while a self-leveling cart automatically adjusts to maintain the load at a safer lifting height, yet surprisingly this technology has not yet been combined to yield the hybrid device.

The impetus for the creation of better equipment will be increasing knowledge and information gained by customers as well as manufacturers. Another is cost benefit. If it can be shown that interventions using ergonomic equipment reduce the risk of musculo-skeletal injuries and low back disorders, and this is communicated effectively to the industries through a cost-savings lens, then the likelihood of a shift in manufacturing and demand for ergonomic material handling equipment is more likely to occur.

#### **Conclusion:**

Most major manufacturers of material handling equipment can be found using the internet. All internet websites have their differences, strengths, and weaknesses. Locating material handling equipment with specific ergonomic features comes with challenges specific to each website and the type of equipment sought. Most websites are geared toward the advertisement and sale of this equipment, and salespeople can often be contacted to assist the customer with their order, and in some cases customize the equipment.

The database that was developed is a cross sectional-sample of commercially available ergonomically designed equipment that can be found on the internet. It is by no means an exhaustive list. It will be published to the NIOSH website for use by industry stakeholders. The intention is to illustrate the abundance and variety of equipment, and to give them ideas about how this equipment may be useful to them.

The shortcomings of material handling equipment design and availability include insufficient combining of useful features into more versatile, hybrid devices. To drive the creation of more versatile and better ergonomic material handling devices manufacturers and customers must receive education and information to prove to them the cost-benefit of instituting such equipment.

Recommendations for the use of specific devices for material handling tasks in the WRT, TWU, and manufacturing sectors have not been made at this time. This project requires further development into the application of equipment in the workplace, and will likely be on-going.