

**Ergonomics Assessment of the Zonzini stair
climber**

Report

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FOR: Zonzini UK

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Introduction

This report describes an expert ergonomics assessment of the Zonzini stair climber, carried out for Zonzini UK. The assessment is a review of the ergonomics and safety aspects of the product undertaken by a chartered Ergonomist specialising in product safety. The assessment was undertaken with one brief observation of one operator demonstrating the use of the device. Video recording was made for subsequent analysis.

1.1 Manual Handling Risks

Handling heavy loads not only places strain on the muscles but also increases the wear and tear on the spine itself, especially the lumbar intervertebral discs. Back disorders can be painful and can lead to long absences from work (Kroemer & Grandjean, 2001). The HSE estimate that in 2014/15 1.2 million people suffered from work related ill-health, of which 40% was related to musculoskeletal disorders. Back pain is the most common type of occupational ill health in the UK. It is also critical to recognise that back injuries are not just observed as specific incidents (the proverbial 'slipped disc'). Repeated strain can lead to cumulative damage.

In the UK, employers have duties under the Manual Handling Operations Regulations 1992 which include, where possible, avoiding the need for employees to undertake any manual handling operations at work which involve a risk of being injured or, where this is not reasonably practicable, to assess and reduce the risks to the lowest level reasonably practicable and provide employees with information on the weight and weight distribution of loads.

The provision of handling aids is often seen by organisations as a quick and relatively inexpensive solution but, choice of manual handling aid requires careful consideration and their use is often restricted or hindered by floor surface, the pushing and pulling forces required for some manual handling aids are considerable, space is required for manoeuvring aids and the use of the aids may obscure the vision of the operator.

Operation of the Zonzini

The zonzini stair climber is a power assisted stair climbing trolley designed to facilitate the transport of heavy and bulky objects up and down all types of stairs of loads up to 400kg in weight. The

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zonzini rotates on its own axis allowing transfer of loads in small spaces, for example, on narrow stair cases.

Operation of the device enables the operator to always be behind the trolley (whilst ascending and descending) so that they can maintain good vision when transporting the load. This minimises the risks of slips and falls inherent in handling of bulky and heavy loads on the stairs. The device is also operable by a single person.

The device has a height adjustable handle of between 950mm and 1370mm. Whilst the minimum height of the handle might still be high for the smallest female (5th percentile female elbow height of 917.6mm) resulting in the arms being raised for operation the use of the trolley requires no force for pushing or pulling whilst used with the motor and therefore reduces the risk of injury. Because the control console can be removed from the handle for operation this allows operators to maintain vision whilst using the device with a tall load.

To transfer a load to the trolley lifting columns are available which can be slid under the load to raise the height of the load such that the trolley can then be pushed underneath and the load lowered on to it without any manual handling. It is possible to tilt a load and then manoeuvre it onto the trolley manually but it is strongly recommended this be avoided as this would require any operator to maintain a hold of a bulky or heavy load as well as lifting. It is therefore strongly advised that lifting columns are purchased for use with the device.

Figure 1. Lifting column



Training

The zonzini is accompanied by a comprehensive instruction manual but this should not be relied upon for its operation. Training in the use of the device is essential to ensure that operators are aware of the necessary procedures for using the device, especially placement of the device at the stair before descending and the requirement to put the device in automatic mode for use on the stairs.

Using an additional flash card (brief instruction card) with the device showing the essential operating features will allow any operators to make quick reference to the procedure and essential safety precautions during early use of the device. This can be used as a memory aid after training.

Regulations

The Provision and Use of Work Equipment Regulations (PUMWER) 1998 states that for remote-controlled self-propelled work equipment:

Every employer shall ensure that where remote-controlled self-propelled work equipment involves a risk to safety while in motion—

- (a) it stops automatically once it leaves its control range; and
- (b) where the risk is of crushing or impact it incorporates features to guard against such risk unless other appropriate devices are able to do so

The joystick which operates the device automatically moves back to the central position if released, stopping the trolley automatically. Because operators are never required to stand in a position where risk of impact could be likely this further reduces the risk.

As a precaution it is advised that when using the device advice/warning boards for other stair users are used so that the stairs are clear for the operators to move a load. These should be placed at both the bottom and top of stairs where the device is being used.

Conclusions and summary of recommendations

A significant advantage of using the zonzini and lifting columns is that it removes the need for any manual handling of loads when transferring using the motorised trolley (in accordance with the

manual handling operations 1992). A load can be moved by one trained individual. It can be used on any type of flooring, does not require pushing and pulling to operate and does not obscure vision of the operator who is able to adopt an upright standing posture at all times. Recommendations to assist in its operation are:

- Use of the lifting columns is essential for safe transport of a load onto the device
- Operators must be trained in the use of the device
- Advice/warning boards should be placed at the top and bottom of stairs whilst the device is in use
- A flash card attached to the device for reference at all times would benefit users in the early stages of use