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A Review on Walker Materials and Design

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Abstract – *Old age comes with many diseases and health problems one of them is not being able to walk without external help. People use walkers, crutches, walking stick for this purpose. These equipment do not allow the user to move on elevated surfaces. Proper materials should be selected for designing walker for safety of the user. This paper discusses about changes in walker design and material selection.*

***Key Words*:walker,wheel, strength, weight reduction, materials**

1. INTRODUCTION

For several years, researchers have been addressing the needs of persons with mobility disabilities through alternative or augmentative devices. These solutions are selected based on the degree of disability of the user. For the purposes of this reviews will present, on the one hand, alternative devices, which are used in case of total incapacity of mobility. These devices are usually wheelchairs or solutions based on autonomous especial vehicles. On the other hand, the augmentative devices are developed to users with residual mobility capacities. They are used to avoid, whenever possible, the inadequate use of alternative devices, thus improving the physical and cognitive capabilities. These elements can be used as mobility-training devices, self-portable devices, such as prostheses or external, such as crutches, canes and walkers.These equipment allow the user to walk on plane surfaces only. These make them dependent on external help during climbing up the elevated surfaces. There should be changes made in the existing design of walker to solve this problem allow the user to be independent. Some of the available designs of the walkers are studied.

1.1 Standard Walker

It has use the aluminium crutch with high quality aluminium alloy treated for the surface and sponge for the hhandle. These walkers have a gear for the height adjustment and also anti-skidding rubber foot-pads with metal slice inside it, which make it more durable. It has come for the free size.

Material	(a) Aluminium alloy treated on surface (b)Sponge foaming handle.
Advantages	(a)Anti skidding rubber foot pads and metal slice inside which make it durable (b) gears for height adjustment

1.2 Rollite Walker

This type of walkers are totally are made from the lightweight aluminium for the frame. It has come with 27 inches for overall width and 32-36 inch for the height adjustment. It weight are around 300 lb. This Rollite rollator are easier to handle because it has come with a roller to make it easy to move. It also has the ergonomic hand brakes lock the rear wheels for the security.

Material	(a)Light weight aluminium frame with electric red colour
Advantages	(a) Flexible backrest for comfort. (b) Ergonomic hand brakes lock the rear wheels for security (c) Flip-up seat with built-in handle

1.3 Invacare Rollators and Rolling Walkers

This walker has a basket that have the standard size for the user to easy storage and transport. It offers great manoeuvrability, stability, and height adjustable. It has the height adjustment about34-38 inches and has overall depth 5'6-6'3 feet with width 27 inch. The weight is about 131 lb.

Materials	(a) Light aluminium
Advantages	(a) Easy to operate, ergonomic hand brakes lock the rear wheels for security. (b) Removable foam-padded straight backrest (c) Basket Standard

1.4 WalkliteWalker

This walker has been made from light aluminium. The dimension of this walker is 80-90cm for height and 44.2cm for the width and 5.7kg weight. These have only rollers on the back wheel and have no brakes been made from light aluminium.

Materials	(a)Durable aluminium provides strength while remaining light weight (b) Contoured, plastic grips for enhanced comfort and a secure hold.
Advantages	(a)The secondary handles provide stable assistance from a seated to a standing position. (b) Single release folding mechanism is designed to aid users with limited hand dexterity. (c) Can be used as a portable toilet safety frame

2.LITERATURE REVIEW

Maria Joseph published a journal on Aluminium , A metal of choice. In this they describe the properties of Aluminium. Aluminium is a light, conductive, corrosion- resistant metal with a strong affinity for oxygen. This combination of properties has made it a widely used material, with applications in the aerospace, architectural construction and marine industries, as well as many domestic uses. . Aluminium is the second most widely used metal in the world today. Aluminium is not found in its metallic form in nature. It occurs as bauxite, a mixture of aluminium oxides, iron oxides and clay. Manufacturing aluminium metal from bauxite is a complex process.. Because of its light weight and electrical conductivity, aluminium wire is used for the long- distance transmission of electricity. Aluminium's strength, light weight, and workability led to increased use in transportation systems, including light vehicles, railcars, and aircraft in efforts to reduce fuel consumption. Aluminium's excellent thermal properties and resistance to

corrosion have led to its use in air conditioning, refrigeration, and heat-exchange systems.

Aditoro Kareem published a journal Effect of Environment on the Mechanical Properties of Mild Steel. In this the author describes the properties of mild steel. Mild steel is a material which is universally used, especially in developing countries. Mild steel refers to low carbon steel; Typically the American Iron and Steel Institute (AISI) grades 1005 through 1025, which are usually used for structural applications (Wagner, 2003).). The numerous successful uses of mild steel in critical components in all sectors of industry highlights its versatility and suggests many additional applications, hence the need to investigate its behaviour in various environments becomes imperative. Mild steel (iron containing a small percentage of carbon, strong and tough but not readily tempered), also known as plain-carbon steel and low-carbon steel, is now the most common form of steel because its price is relatively low while it provides material properties that are acceptable for many applications. Mild steel contains approximately 0.05–0.25% carbon making it malleable and ductile).Low-carbon steels suffer from yield-point runout where the material has two yield points. The first yield point (or upper yield point) is higher than the second and the yield drops dramatically after the upper yield point. If a low-carbon steel is only stressed to some point between the upper and lower yield point then the surface develop bands. Low-carbon steels contain less carbon than other steels and are easier to cold-form, making them easier to handle.

F Julian published Metallurgy of cast iron ,describing the properties of the cast iron. Cast iron is a family of metals produced by smelting metal, and then pouring it into a mould. The primary difference in production between wrought iron and cast iron is that cast iron is not worked with hammers and tools. There are also differences in composition—cast iron contains 2–4% carbon and other alloys, and 1–3% of silicon, which improves the casting performance of the molten metal. Small amounts of manganese and some impurities like sulphur and phosphorous may also be present.

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