Exoskeleton: Built to Last, Built to Serve, and Built to Protect

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The purpose of this project was to build an exoskeleton (MK-I, MK-II) that can augment human strength whilst lifting heavy/large objects for an extended amount of time. Design goals for the exoskeleton included comfort, size, and lifting capabilities. In addition, the exoskeleton must be modular so that it may be configured depending on the situation at hand. The exoskeleton frame is built from welded sections of steel square tubing that holds components that allow the exoskeleton to function, such as, the pneumatic tank and compressor as well as the solenoid valves that release air into and out of the pneumatic system. There are two mechanical arms which contain two pneumatic cylinders that push/pull to lift the object using a lever. The whole device is mounted on a camping backpack frame. The first exoskeleton built (MK-I) did not satisfy the design goals of the project because of the discomfort when wearing the exoskeleton and it could not lift as much mass as originally designed. The exoskeleton MK-II had advantages over the MK-I in comfort, brute strength, and battery life. Each exoskeleton contained similar 3d printed parts, such as the handles on the arms and also the feet which allowed the exoskeleton to stand upright. The exoskeleton can be used in many applications and can be configured for the task by fitting modular components for diverse tasks such as lifting, fire suppression, medical applications, and military usage.

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