ENERGY ABSORBING VEHICLE BARRIER

BACKGROUND

Field of the Invention

[0001] The present invention generally relates to a vehicle barrier, and in particular, a vehicle barrier capable of absorbing energy of an impacting vehicle in a non-lethal manner.

Technical Background

[0002] Energy absorbing vehicle barriers, such as highway crash cushions, are typically used alongside highways in front of obstructions such as concrete walls, toll booths, tunnel entrances, bridges and the like. One type of crash cushion utilizes a plurality of energy absorbing elements disposed within an array of diaphragms and an array of fender panels extending alongside the diaphragms. In the event of an axial impact, the crash cushion is designed to absorb the kinetic energy of an impacting vehicle as the crash cushion collapses in the axial or longitudinal direction. As the crash cushion collapses, the diaphragms move closer to one another and the fender panels telescope over one another, which causes the energy absorbing elements disposed within the diaphragms to compress and deform, thereby absorbing the kinetic energy of the impacting vehicle. After such a collision, many of the component parts can be reused by repositioning the diaphragms and the fender panels in their original position, and replacing the energy absorbing elements and other damaged components. Typically, the energy absorbing elements are not restrained in the vertical direction for ease of assembly and rehabilitation.

BRIEF SUMMARY

[0003] In one aspect, ~~one embodiment of~~ an energy absorbing vehicle barrier includes a frame defining a compartment, an energy absorbing cartridge disposed within the compartment and a retaining device coupled to the frame. The retaining device may be disposed above and extend

over at least a portion of an upper surface of the cartridge. The retaining device is adapted to contact and engage the upper surface of the cartridge when the barrier~~compartment~~ is impacted by a vehicle such that the retaining device substantially prevents movement of the cartridge in at least a vertical direction during impact.

[0004] In one embodiment, the frame may include first and second longitudinally extending sides disposed on opposite sides of the compartment and a nose extending between the first and second sides. The retaining device may be configured as a bracket attached to the nose, with the bracket cantilevered over an upper surface of the cartridge in one embodiment.

[0005] In another embodiment, the retaining device includes first and second ends coupled to the longitudinally extending sides of the frame, including the nose in one embodiment. The retaining device extends laterally substantially across an entire width of the cartridge. In one embodiment, the retaining device may include a bar releasably coupled to the frame.

[0006] In another aspect, a method of arresting a~~n impacting~~ vehicle includes providing an energy absorbing vehicle barrier including at least one frame defining a compartment and an energy absorbing cartridge disposed within the compartment. A retaining device is coupled to the frame and is disposed above and extends over at least a portion of an upper surface of the cartridge. The method may also include impacting the barrier with a vehicle and restraining the cartridge in at least a substantially vertical direction with the retaining device during the impact such that the retaining device and the frame substantially retain the cartridge within the compartment during the impact.

[0007] In yet another aspect, a method of assembling an energy absorbing vehicle barrier includes assembling a frame to define at least one compartment, the frame having at least two opposing sides extending in a longitudinal direction thereof and a nose extending between and coupled to the sides; placing a cartridge within the compartment and