THE HEX-FOAM® SANDWICH SYSTEM

The wide-hazard crash cushion for light and heavy vehicles

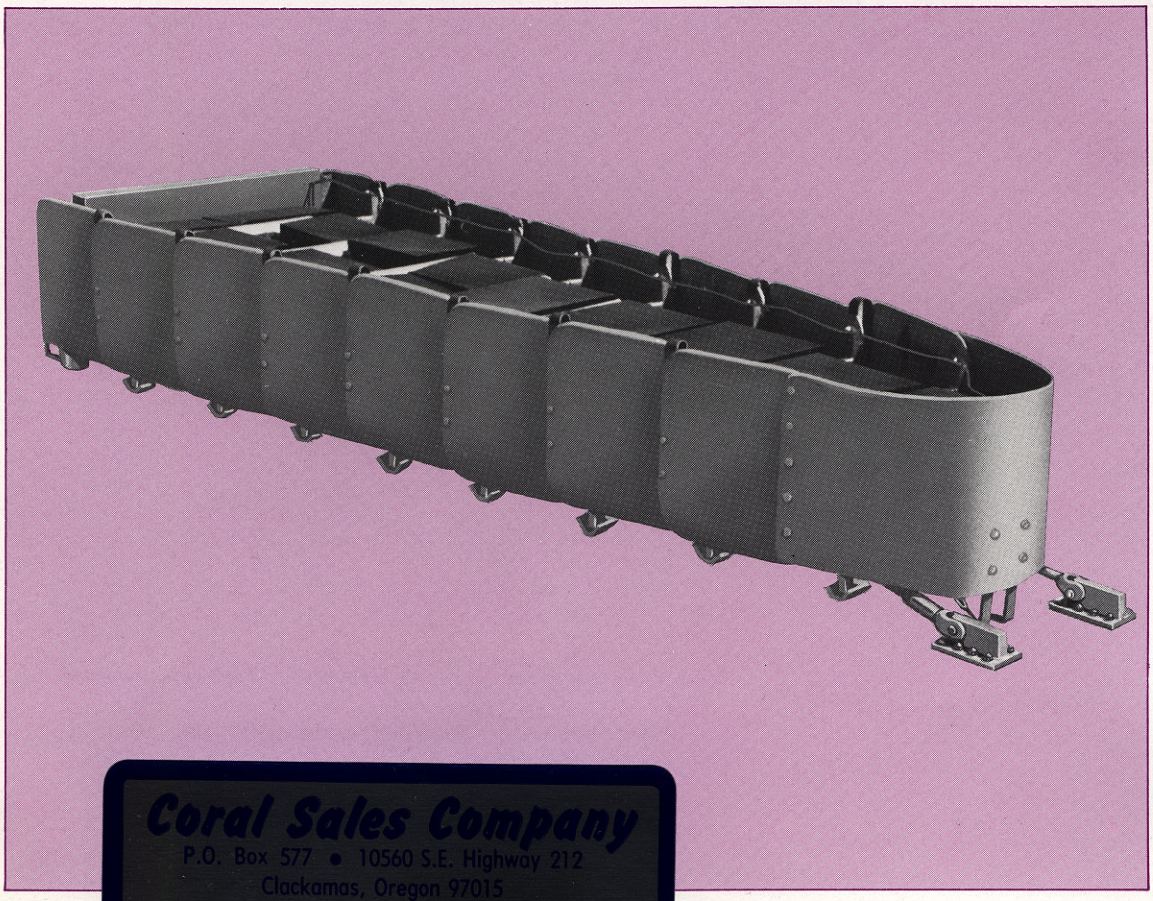
- **Quickly restorable • Redirective capability**
- **Requires just three cartridge sizes**
- **Conversion capability for all existing cell sandwich attenuators**

The Hex-Foam® Sandwich System provides today's downsized cars with the same impact protection it affords heavier vehicles. It is effective in head-on and angle hits at speeds up to and in excess of 60 mph. The system offers optimum protection from wide hazards such as bridge piers and toll booths.

The system consists of a series of crushable Hex-Foam® cartridges placed between lightweight tubular steel diaphragms and surrounded by telescoping fender panels. When hit head-on, the energy-absorbing cartridges are crushed, stopping the vehicle gently. Hit at an angle, the Hex-Foam® Sandwich System safely redirects the vehicle. Bidirectional fendering is available for two-way traffic situations.

Only the cartridges are expended in a crash. Because only three sizes of cartridges are used, they are convenient to stock and easy to replace.

The Hex-Foam® Sandwich System is available in standard widths, from 3′0″ to 7′6″, to protect motorists from wide hazards as unobtrusively as possible. The system's superior energy dissipation for all sizes of vehicles, as well as its easy installation and maintenance, makes it a simple, effective, and economical lifesaver!



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SEE OTHER SIDE FOR MORE DESCRIPTIVE INFORMATION AND SPECIFICATIONS

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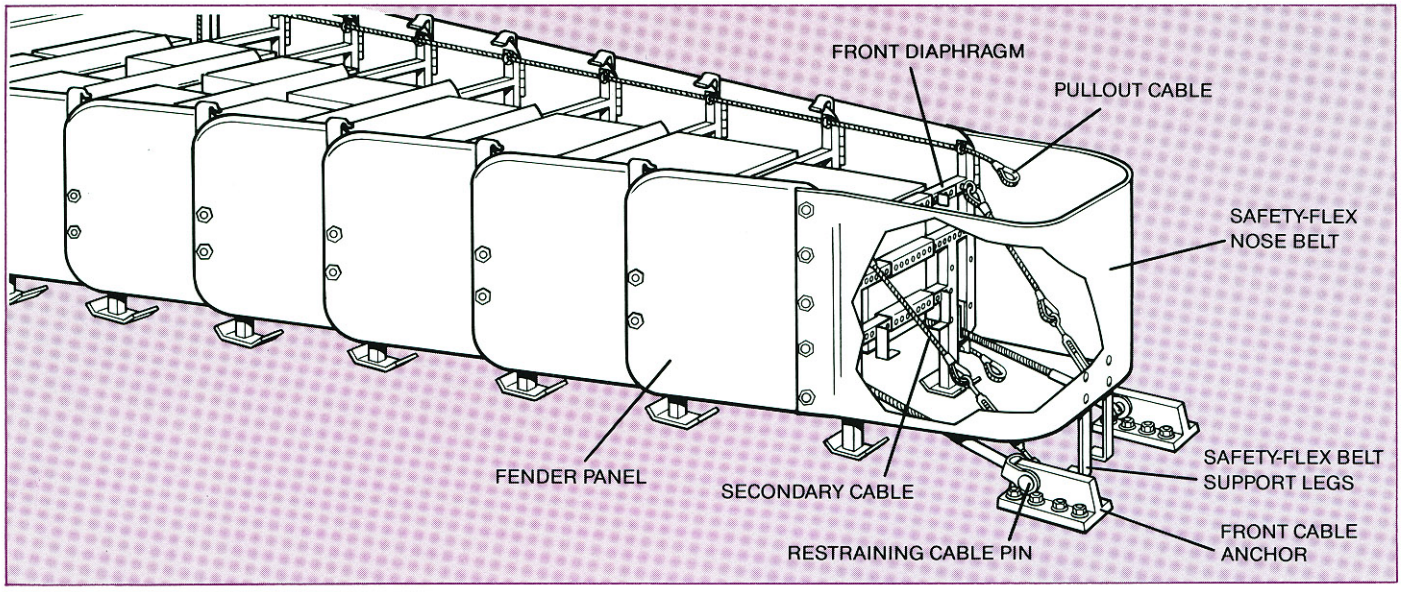

APPLICATIONS:

- Especially effective at high-accident-frequency hazards because it is economical to renew after a crash.
- At hazard sites where both head-on cushioning and side-angle redirective capabilities are needed.
- Where wide hazards exist.
- Each unit is designed for standard applications, or special designs are reviewed by our professional engineers, who adhere in every detail to applicable federal and state criteria.

SYSTEM CHARACTERISTICS:

• Minimum width at back-up (standard unit)	3′0″
• Maximum width at back-up (standard unit)	7′6″
• Length	9′4½″ to 28′11½″ (4 to 12 bays)
• Debris scatter	Generally none
• Equipment needed for repair	Maintenance truck, tow chain, wrenches

BACKUP ADAPTABILITY:

Cast-in-place concrete backup with metal straps to attach the Hex-Foam® Sandwich System.

Wide-flange galvanized steel beams embedded in concrete, used where no concrete had existed.

Diagonally braced galvanized struts, bolted to existing concrete deck.

Horizontally braced galvanized steel structural tubing, bolted to sides of existing concrete structure.

ENERGY ABSORPTION SYSTEMS, INC.

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DESIGN ADVANTAGES:

- The Hex-Foam® cartridges are available in three sizes to fit all attenuator models.
- Installation can generally be completed by a three-man crew within a day.
- After-crash renewal is fast, usually less than an hour for a three-man crew.
- A consistently safe deceleration G-load is maintained by the Hex-Foam® Sandwich System for both light and heavy vehicles at all speeds included within the limits of the design criteria. The exceptional energy-absorbing characteristics of the system are illustrated in the graph at lower right. While the graph information is accurate, it is not intended for use in specifications. Please contact Energy Absorption Systems, Inc., for design assistance before detailing a Hex-Foam® Sandwich System.

DESIGN DATA TABLE

No. of Bays	Nominal Length *	Design Velocity	KPH / MPH	64 / 40	72 / 45	80 / 50	88 / 55	97 / 60	105 / 65	113 / 70
4	10′-5 1/2″ (3.19m)	Average G-Load KIPS (peak) **		6.0 / 45	7.6 / 55	9.3 / 70	11.4 / 85	13.5 / 100	15.9 / 115	18.4 / 135
5	12′- 8 1/2″ (3.87m)	G's / KIPS		5.0 / 35	6.3 / 45	7.7 / 55	9.4 / 65	11.1 / 80	13.1 / 95	15.2 / 110
6	14′-11 1/2″ (4.57m)	G's / KIPS		4.2 / 30	5.3 / 40	6.6 / 45	8.0 / 55	9.5 / 65	11.1 / 80	12.9 / 90
7	17′-2 1/2″ (5.25m)	G's / KIPS		3.7 / 25	4.6 / 35	5.7 / 40	6.9 / 50	8.2 / 60	9.7 / 70	11.2 / 80
8	19′-51/2″ (5.93m)	G's / KIPS		3.2 / 25	4.1 / 30	5.1 / 35	6.1 / 45	7.3 / 50	8.5 / 60	9.9 / 70
9	21′-8 1/2″ (6.62m)	G's / KIPS		2.9 / 20	3.7 / 25	4.5 / 30	5.5 / 40	6.5 / 45	7.7 / 55	8.9 / 65
10	23′-11 1/2″ (7.30m)	G's / KIPS		2.6 / 20	3.3 / 25	4.1 / 30	5.0 / 35	5.9 / 40	6.9 / 50	8.0 / 55
11	26′-2 1/2″ (8.00m)	G's / KIPS		2.4 / 20	3.0 / 20	3.8 / 25	4.5 / 30	5.4 / 40	6.3 / 45	7.3 / 50
12	28′-5 1/2″ (8.67m)	G's / KIPS			2.8 / 20	3.5 / 25	4.2 / 30	5.0 / 35	5.8 / 40	6.8 / 45

WARNING: SHADED AREA [ ] DENOTES EXCESSIVE DECELERATIONS BASED UPON THE OCCUPANT RISK RECOMMENDATIONS OUTLINED IN NCHRP 230 FOR 4500 lb [2000 kg] VEHICLES.

*Total length of unit as measured from front face of backup to forward edge of front cartridge. Values shown in table above are based on 85% efficiency.

**Formula for calculating the metric equivalent force on the backup structure: (20,000) (Average G's from Design Data Table) (1.5) = Force measured in Newtons

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