Association Canadienne de l'Industrie des Plastiques ACIP
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Innovations in Plastics Help Protect Extreme Sports Athletes

Toronto, ON – Sept. 27, 2013 – Extreme sports athletes push themselves—and their equipment—to the limit. To help them prevent injuries and perform their best, competitors in motocross, rally cross, skateboarding, BMX biking and mountain biking depend on the constantly evolving safety gear made possible by a broad mix of tough, cushioning, and high-performance plastics.

That's also good news for amateur athletes, since the high-tech innovations created for the extreme athletes often are adapted for us mere mortals—in fact, many high-performance plastics initially used in safety gear for professional athletes today can be found in the everyday safety gear on neighbourhood sports store shelves.

Here are some examples of how plastics are used to help protect extreme sports athletes.

Helmets

Extreme sports often involve high speeds, gravity-defying stunts, daring jumps—and collisions with other competitors and the earth. That's why nearly all these athletes wear helmets made with tough, shock-absorbing plastics. While helmets vary depending on the sport, they have the same basic components:

- To help absorb shock, the outer shell is made with hard plastics such as:
  - carbon-fibre-reinforced plastic composites (used to make racing cars),
  - glass-fibre-reinforced plastics (often called fibreglass),
  - ABS (acrylonitrile butadiene styrene, the same plastic used in LEGO® bricks), or
  - aramid fibres (DuPont's Kevlar® is one of the best known).

These high-performance plastics offer excellent impact resistance—they're also lightweight to help prevent head and neck fatigue.

- A compressible inner layer made with foam plastics such as polystyrene or polypropylene provides extra cushioning. The characteristics of the foam can be engineered to suit the needs of individual athletes and sports. For example, the plastic foam in a motocross helmet may be designed to withstand a single large impact, whereas skateboarders may wear helmets lined with plastic foam that can be compressed repeatedly in multiple smaller impacts.

- Helmets often have additional plastic components customized to suit the demands of each sport. For example, extreme athletes such as mountain bikers or rally cross drivers usually wear a full-face plastic helmet that helps protects the athlete's head, face and jaw from crash impacts.

Eye Protection

Extreme athletes often travel at high speeds while fighting dirt, debris, and inclement weather conditions, so protective eyewear is essential for many of these sports. While the size and shape of eyewear can vary depending on the sport, plastics play a crucial role:

- Frames for goggles used in most extreme sports typically are made with a lightweight plastic, such as nylon or polyurethane, that offers the durability and slight flexibility needed to withstand the intensity of the sports. The frame often is lined with a layer of soft foam plastic to improve comfort and fit.
- Stretchy plastic goggle straps are often lined with silicone, a heat-resistant plastic (also used in your kitchen spatulas) with a slightly gummy texture that helps the goggles stay put on the athlete's head.
- Goggle lenses are made with polycarbonate, a lightweight, nearly unbreakable clear plastic (used to make bullet-resistant "glass") that helps protect riders' eyes from debris while providing a clear view of the road. Thanks to its superb optical clarity, polycarbonate also is frequently used in lenses in helmets with attached visors.

Padding

Proper padding is not just for youngsters on bikes. The tricks and stunts that extreme athletes perform are often quite dangerous, so proper padding is essential, even for a seasoned pro. For sports such as skateboarding, mountain biking and motocross, competitors wear pads generally made with a variety of durable but lightweight plastics:

- Elbow and knee pads often are made with a hard, shatter-resistant plastic such as ABS to absorb the impact of a fall.
- The pads typically are held in place with soft, comfortable neoprene plastic (also used in wet suits) and secured with hook and loop fasteners made of plastics (like Velcro®, for example). These lightweight plastics offer flexibility while providing a secure, reliable fit.
- Pads are usually lined with foam ethylene-vinyl-acetate (EVA) plastic (the plastic that's also used for moulded mouth guards) that moulds to the shape of the elbow or knee to provide comfort and additional shock absorption.

In sports where full body falls may occur, such as in BMX, motocross and mountain biking, riders also may wear additional body protection, such as a chest plate and spine protector. These usually are made with various tough plastic shells and foam padding for cushioning, along with stretchy spandex (the same plastic used in bicycle shorts and women's swim suits) for comfort and fit.

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