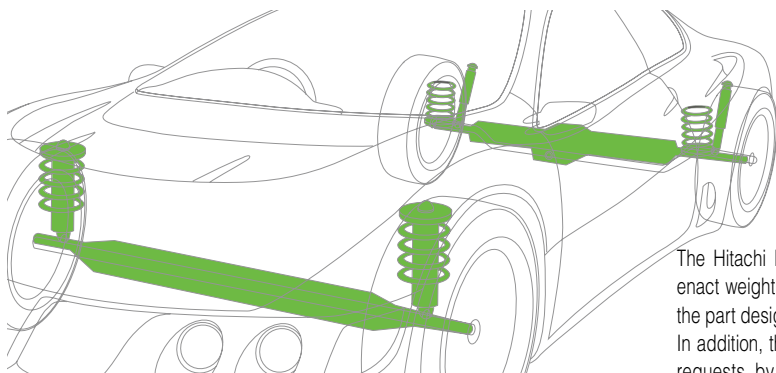


Our Dreams  
Onboard

# Chassis & Body



The Hitachi Metals Group places a high priority on being able to enact weight reduction actions to your current vehicle by optimizing the part design as well as utilizing lightweight material substitutions. In addition, the group aggressively responds to auto manufacturers' requests by maximizing our leading-edge casting and surface treatment technologies.

## Suspension Components and Materials

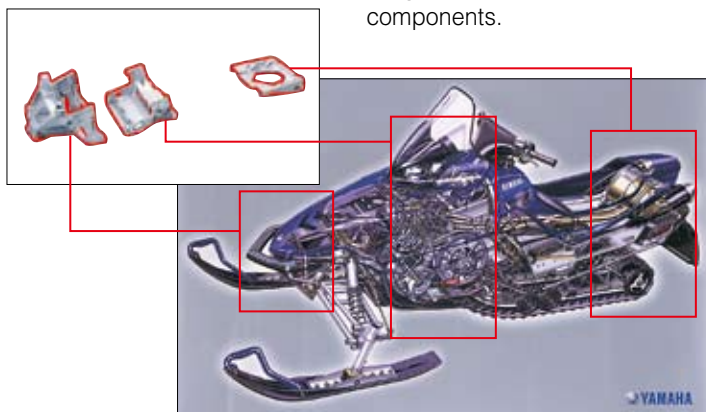
### High-Vacuum Aluminum Die Castings (Produced with the HIVAC-V [Hitachi Vacuum Die Casting] Process) [Automotive Components Company]



Chassis components of snowmobiles

By adopting die castings, the number of component items at the front frame has been considerably reduced and vehicle mass has decreased by approximately 30% compared with traditional component manufacturing methods. The HIVAC-V, an improved method of vacuum die casting, and the development of high-strength, high-toughness materials for die casting have made possible the use of die castings for suspension and frame components that require maximum strength and toughness.

By converting to high strength/toughness HIVAC-V die castings, the number of individual components making up the snowmobile frame has been dramatically reduced as well as realizing a 30% weight reduction versus conventional stamped steel/welded components.



Example of a snowmobile product

(photo supplied by YAMAHA MOTOR CO., LTD.)

**Semi-Solid Aluminum Die Castings  
(Produced with the SSM [Semi-Solid Metal Casting] Process)**

[Automotive Components Company]



A front lower link and a rear upper arm

The SSM process was developed for aluminum suspension components of which the primary requirements are high strength and high toughness. Hitachi Metals's SSM process does not use commercial SSM globular microstructure billets. Instead, we form the special microstructure (which provides maximum strength) by stirring electromagnetically molten aluminum already in the shot sleeve. This process improves the strength and toughness of aluminum components of which performance is comparable to aluminum forged products. Semi-solid die castings thus contribute to reducing the weight of overall car suspension parts such as suspension links, upper arms and lower arms.

**High-Quality Aluminum Alloy Castings  
(Produced with the FAHM [Feed And Heat Management] Process)**

[Automotive Components Company]

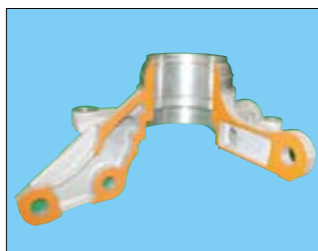


A knuckle housing

The FAHM process is a die casting method that has a sophisticated conventional permanent mold die design and uses HOAN technologies by drawing on CAE\* technology. The combination of using a simulation model for molten liquid flow and solidification at the product design stage along with molten liquid cleaning technology, has enabled stable mechanical properties for castings. This process excels in cost performance compared with the liquid forging process because hollow shapes can be molded. The aluminum alloy components produced with this process help reduce the weight of suspension components such as knuckle housings.

\* CAE

Computer Aided Engineering. This means to predict, analyze and improve the performance of products via computer simulations.



Cross-section of a hollowed knuckle housing

**“HNM™ Series” High-Toughness Ductile Iron Castings**

[Automotive Components Company]



HNM™ series castings

Hitachi Metals' unique HNM™ series of castings offer distinctive features such as improved low-temperature toughness and superior dimensional precision. Using our time-honored casting design and development expertise, HNM castings are delivered in a near-net-shape state, which results in more lightweight components and a further reduction of automobile weight. These iron castings are suitable for a variety of automotive parts including suspension and driving system components.

Aluminum Wheels

**“SCUBA™” Wide-Rimmed Aluminum Wheels Provide Sophisticated Design**

[Automotive Components Company]



SCUBA™

By using CAE technology, SCUBA™ wide-rimmed aluminum wheels are able to offer both sophisticated design and light weight. Regarding spoke design, a 3.5-degree minimum draft is possible, along with a minimum thickness of 3.0 mm. These features have enhanced car designers' ability to create aluminum wheels with an attractive appearance.

\* SCUBA™

This is the acronym of “Sharp-styled Casting & Uncompromised Bright Appearance”

