

The 41st Tokyo Motor Show and the Use of Aluminum in Japanese Cars

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Report from Motor Show

The 41st Tokyo Motor Show, sponsored by the Japan Automobile Manufacturers Association, took place from October 24 to November 4 at the Makuhari Messe convention center in the Chiba Prefecture. The major automakers outside of Japan did not participate in this biennial motor show nor did any of the commercial vehicle manufacturers. One reason for this was the impact of the global recession, caused by the financial crisis starting in the U.S. in the fall of 2008, on the auto industry. Furthermore, the focus of attention has shifted to the Chinese market as that country's auto production is now the largest in the world. As a result, the exhibition area was halved from the previous show to less than 22,000 sq. meters.

However, Toyota Motor Corp., Nissan Motor Corp., and Japan's other leading domestic automakers concentrated their efforts in every aspect on addressing the issue of ecology. This was demonstrated by the display of environmentally friendly electric and hybrid vehicles. From that standpoint, a very high grade can be given to the standard of the motor show.

On the whole, there was a growing tendency to downsize cars and make them lighter by using aluminum, plastic, or composite materials. As electric and hybrid vehicles took the center stage, displays of batteries also attracted attention. A summary focusing mainly on electric vehicles and the approaches taken by the automakers follows.

Electric Cars

i-MiEV, Japan's first volume-produced electric vehicle, which was displayed by Mitsubishi Motors Corp., drew attention (Figure 1). Lithium-ion battery modules, which use a large volume of aluminum foil, are made up of 88 battery cells and installed under the middle of the body floor of the i-MiEV to lower its center of gravity and also to provide stabilization. The model weighs about 1,100 kg, with the battery pack accounting for more than 20% of that at about 230 kg. Total voltage is 330 v and battery capacity is 16 kWh. A single charge enables the vehicle to travel 160 km.



Figure 1. Mitsubishi's i-MiEV.

Mitsubishi Motors released i-MiEV in July 2009 and has already delivered 6,000 units since. According to the company's projection, sale of the model is expected to reach 7,000 units in 2010, 15,000 in 2011, and 30,000 in 2012.

Nissan Motor Co. displayed four models of electric vehicles, one of which is called the Leaf (Figure 2). The



Figure 2. Nissan's Leaf.

company's president, Carols Ghosn, described the Leaf as the current main model suited for a zero-emissions society. Sale of the model is slated to begin in the U.S., Europe, and Japan in late 2010. Nissan hopes to achieve sale of 50,000 units a year.

Structure of the lithium-ion battery on Leaf is four cells in each module and there are 48 of these modules. So, Leaf has 192 battery cells, almost twice as many as those on Mitsubishi's i-MiEV. Total voltage is 345 v and battery capacity is 24 kWh. It can be charged from a household power source and can travel more than 160 km on one full charge lasting eight hours. A battery cell has a thin laminated structure composed of aluminum foil and plastic materials. Dimensions are about 30 cm long, 20 cm wide, and 0.7 cm thick. In 2007, Nissan established Automotive Energy Supply Corp. (AESC), a company specializing in the manufacture of auto batteries. AESC is planning to manufacture 65,000 lithium-ion batteries by 2011.

Although a strong feature of Toyota Motor and Honda Motor Co. are their hybrid models, attention was drawn to the concept electric vehicles displayed by the two automakers. Toyota is now moving forward with the production of hybrid models of Estima, Crown, and Lexus in addition to the Prius brand that it has been producing. At the same time, the company produced and released FT-EVII (Figure 3), its first electric vehicle with a lithium-ion battery mounted on it. Specific plans for its sale have not been announced yet, but the company expects to launch this in the North American market by 2012. The immediate goal for Honda Motor is to make hybrid vehicles more popular. To this end, two new hybrid ve-



Figure 3. Toyota's FT-EVII .

