

Dynamic Mechanical Properties of Aluminum Alloys Used for Railway Vehicles

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In the tensile or compressive test to measure the mechanical properties of materials, the higher the test speed is, the harder the precise test completion is. Besides, reproducibility of obtained data is more questionable. For these reasons, the dynamic mechanical properties, such as the dependency of properties on strain rate, are not completely apparent with respect to aluminum alloys used for railway vehicles in Japan, especially in terms of weldment. In this research, the dependency of mother metals and weldment on strain rate was investigated using three types of aluminum alloys, 5083-O, 6N01-T5, and 7N01-T5, for railway vehicles. The results of the tensile tests indicated that the 5083-O alloy was the least on the degree of strength decrease in the weld against the mother metal. Each alloy showed that the dependency of proof stress and tensile strength on strain rate was less up to the strain rate of 100s^{-1} , and became larger beyond that strain rate. On the other hand, the results of compressive test revealed that the dependency of proof stress and tensile strength on strain rate of each alloy was less up to the strain rate of 100s^{-1} , and became larger beyond that strain rate.