



## Anisotropy of Fracture Strength of Metallic Materials

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### Research Outline

#### Anisotropy of Fracture Strength of Rolled Metallic Materials

The rolled metallic materials have anisotropy in mechanical properties. The fracture strength anisotropy of rolled metallic materials for structure has been studied in this laboratory.

The fracture strength is evaluated by a fracture toughness test based on fracture mechanics. The compact tension specimens (CT specimen) shown in Fig.1 are used for this test. The directions of the specimens are standardized by the Japan Society of Mechanical Engineers like Fig.2.

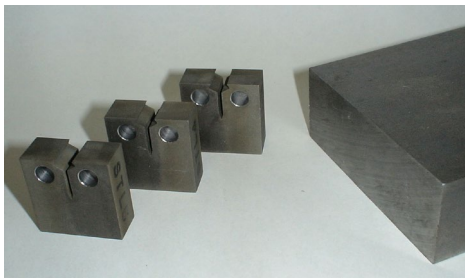


Fig.1 Compact Tension Specimen

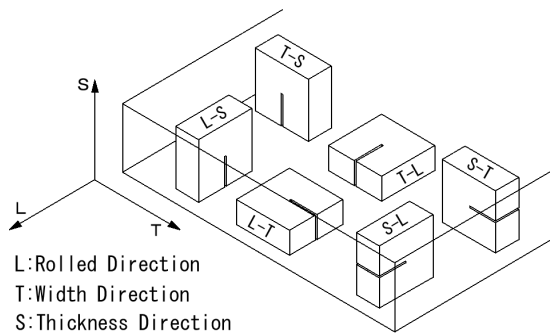


Fig.2 Directions of Specimens

Fig.3 expresses the relations between the fracture toughness values ( $J_{IC}$ ) of the aluminum alloy (A2017) and the specimen directions. The directions of specimens have an influence on the fracture toughness value of materials.

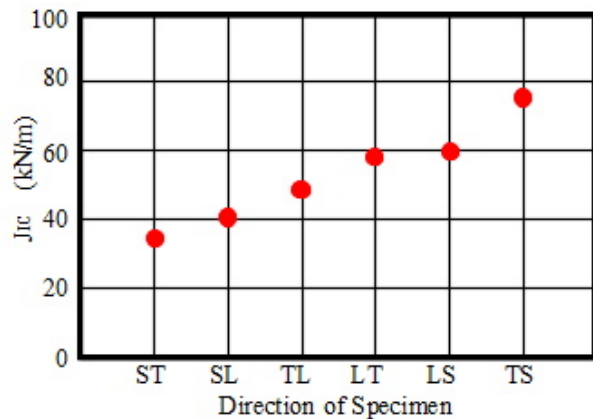


Fig.3 Relation Between the Fracture Toughness Value and Direction of Specimen

#### Various Material Test

In this laboratory, following material tests are possible.

##### 1. Tensile Test / Compression Test / Bending Test

Testing Machine : Universal Testing Machine

Maximum Load : 300kN

##### 2. Fatigue Test

Testing Machine : Oil Pressure Type

Maximum Load : 150kN (Static load)

##### 3. Torsional Test

Testing Machine : Electric motor drive

Maximum Torque : 500Nm

##### 4. Impact Test

Testing Machine : Charpy Type

Maximum Energy : 294N·m