

## Fatigue strength evaluation of 1180MPa class recycled steel

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### ABSTRACT:

The present study investigated the material properties of 1180MPa class recycled steel fabricated from waste scraps to evaluate the required performance of parts as steel sheets for automobiles. The recycled steel showed a strength-ductility performance: tensile strength of 1234 MPa, total elongation of 18%, stretch-frangibility  $\lambda$  of 21%, limiting dome height of 12.2 mm, and limiting drawing ratio of 2.09%. In the fatigue test with a stress ratio  $R = -1$ , the mirror finish material had a fatigue limit of 600 MPa at  $10^7$  cycles to failure for both bending load and axial load. The fatigue limit corresponds to half tensile strength that is believed to be the maximum fatigue limit in cases of surface initiation of fatigue. The fatigue limits obtained by changing the stress ratio under bending load well matched the corrected goodman line. Therefore, the effect of average stress can be reliably evaluated from the fatigue limit diagram. In this way, the 1180MPa class recycled steel sheet has high fatigue strength with sufficient reliability and satisfactory meets the required performance of parts as a steel sheet for automobiles.

### KEYWORDS:

high-strength recycled steel;  $10^7$  cycles fatigue limit; stress ratio; fatigue limit diagram

### Reference

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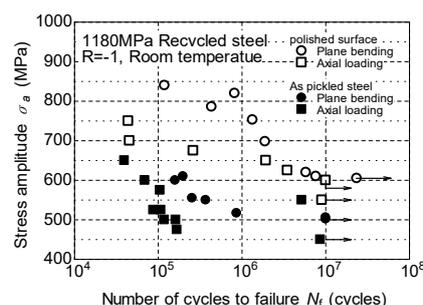


Fig. 1 S-N curves obtained under stress ratio of  $R = -1$ .