

Study on the Advanced Utilization of Iron and Steel Scrap in Automotive Parts (Tokyo Steel Mfg. Co., Ltd.)

Outline of the Verification Project

With the goal of manufacturing steel sheet for automobiles using waste scrap as the main raw material, the study evaluated the applicability of electric arc furnace steel, which includes tramp elements such as Cu and Ni, for automotive parts, calculated environmental improvement effects, and investigated impacts of factors specific to electric arc furnace steel on surface quality.

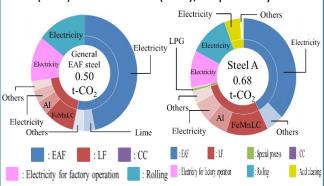
2012

Background and Purpose

Currently, about seven million tons of steel scrap is exported from Japan every year as a valuable resource. This project aims to regenerate surplus steel scrap in Japan for horizontal recycling to create new resource circulation in Japan.

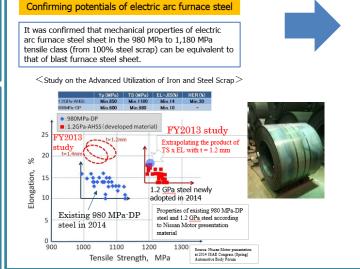
Environmental Improvement Effects

Compared with 1.91-ton CO_2 emissions from manufacturing of plain steel using blast furnaces, which was calculated in the past, CO_2 emissions from manufacturing of plain steel and automotive steel sheet using electric arc furnaces are 0.50 tons (26%) and 0.68 tons (35%), respectively.



Key Points in the Verification Project

Evaluating potentials of electric arc furnace steel made of 100% steel scrap and clarifying issues in pursuing horizontal recycling for automotive steel sheet.



2013

2014

Evaluating applicability of electric arc furnace steel for automotive parts, calculating environmental improvement effects, and investigating impact of factors specific to electric arc furnace steel on surface quality.

Issues concerning impact of tramp elements, specific to electric arc furnace steel, on the quality required for automotive steel sheet (surface quality)

Understanding the phenomenon of Cu on the steel surface in the hot rolling process, and finding a methodology to improve surface quality.

Evaluating manufacturability of general-purpose high-tensile (370–400 MPa) electric arc furnace steel for actual automotive parts, and evaluating impact of tramp elements on basic manufacturing properties.

Clarifying issues if there are any problems

Calculating reduction in ${\rm CO_2}$ emissions from manufacturing of steel products in Japan when the general-purpose high-tensile steel above is used for automotive parts

Conducting inventory analysis in the case of replacing existing steel automotive parts with electric arc furnace steel made of <u>domestic surplus scrap</u> (analyzed/calculated by Prof. Matsubae, Tohoku Univ.)

Progress Towards Commercialization

There is no concern about Cu embrittlement even in the case of 0.30% Cu-enriched electric arc furnace steel. Manufacturability evaluation of actual parts verified that Cu contained in steel scrap is not harmful but can be utilized effectively.







