

## PRODUCTION OF SPUR GEARS FROM RECYCLED SCRAP FERROUS METALS

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### ABSTRACT

Spur gears are important mechanical elements in engineering systems, they are power transmission elements that decide the torque, speed and direction of rotation of all the driven machine elements and the design of such elements is followed by its production (casting and machining). The work presented in this paper was carried out at the Kaduna foundry and machine works, Kaduna in Nigeria and focuses on the utilization of scrap ferrous metal for the production of spur gears. 200 kg of scrap ferrous metal was melted in an electric arc furnace using three electrodes each supplying 6,500A of electricity with 0.12 MW power input. 300 g of carbon was added to improve the mechanical properties (tensile strength, hardness and ductility) of the metal that will be subsequently produced. Ten similar molds with circular profile were prepared for each of the following diameters; 130mm, 602.74mm, 248.19mm, 602.74mm, 59.09mm and 602.74mm. Casting was done in a foundry work shop followed by milling process in which the following numbers of spur teeth; 20, 100, 40, 100, 10, 100 were cut on each of the ten similar cast materials. The gears produced can be used for many applications which include production of gear box system, racks and pinions etc.

**Key words:** Melting, Casting, Machining, Recycling, Scrap metals.