

Cold briquetting of iron ore fines for DRI production: Challenges, Possibilities and Solutions

Anrin Bhattacharyya¹, Chanchal Biswas², Manoj Kumar Mitra³, Rajib Dey³

1.
RECYRON Engineering & Consulting e.U., 8700 Leoben, Austria, ceo@recyron.com

2.
Essar Steel Limited, 394270 Hazira, India

3.
Jadavpur University, 700059 Kolkata, India

ABSTRACT

Fine and ultrafine iron ores have always been a challenging raw material to use in the blast furnace as well as in alternative ironmaking processes. Despite of having superior iron content than lumpy ores, their handling is very difficult. Traditional techniques like sintering and pelletizing have certain limitations in terms of particle size of fine ores as well as a maximum limit to use them in the process in order to maintain optimal process efficiency. In addition, sintering, pelletizing and fluidized bed reduction techniques are highly CAPEX intensive and the operational costs are also higher. The present work describes the possibility of cold-briquetting of fine iron ore to produce DRI (Direct Reduced IRON) in several cost-effective ways using certain novel technologies developed during the last decade. Three possibilities of coal-based solid-state reduction of briquetted fine ore are discussed. The first one is still in laboratory scale and it employs production of self-reducing briquettes for direct reduction. The second one is in semi pilot-scale and uses coal pyrolysis to reduce briquettes. The third one - RECYRON® - is a patent-pending technology which has been developed in Austria. RECYRON® is a highly flexible process to utilize fine ore as well as all possible iron ore and carbon containing wastes to produce DRI. A comparative description of these three processes demonstrates the advantages of cold briquetting of iron ore fines to be used as a suitable raw material for ironmaking.