

**APPLICATION OF GROUND MAGNETIC SURVEY IN IDENTIFICATION
OF GEOLOGICAL STRUCTURES -A GUIDING TOOL FOR IRON ORE
EXPLORATION: CASE STUDY FROM PART OF NOAMUNDI IRON
ORE LEASEHOLD OF TATA STEEL LTD., JHARKHAND**

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Abstract

In India, the application of geophysical techniques as a guiding tool in exploration of iron ore is yet to gain confidence contrary to other developed nations, where these techniques are being extensively used and have achieved substantial success. Besides, the conventional exploration techniques, geophysical magnetic survey has been established as an useful exploration tool for mapping of concealed and subsurface geological structures especially faults, which are difficult to detect through surface geological mapping alone due to lack of surface evidences, particularly in areas of hematite iron ore belt where the effect of weathering, oxidation and lateritization process obscure the original structural imprints. In order to assess the applicability and limitations of magnetic survey in iron ore exploration a 'ground magnetic orientation survey' was conducted over a small block within one of the leasehold areas of Tata Steel in West Singhbhum district of Jharkhand, where exploration including detailed surface geological mapping and close spaced drilling have already been undertaken. The study area falls in the extreme northeastern part of the famous 'horseshoe synclinorium' within Singhbhum-Bonai-Keonjhar iron ore belt, which is known to be one of the prominent iron and manganese provinces of the country. Detection of local scale faults and interpretation regarding the orientations of different structural features were aimed at through this ground magnetic orientation survey. The interpretations based on this magnetic survey were analyzed in conjunction with available surface geological and drillhole information of the study area which indicates a fair correlation with the established regional structures and deformational pattern of the Singhbhum-Bonai-Keonjhar iron ore belt. Based on this study, it was felt that ground magnetic survey can bring out concealed and subsurface geological structures quite well. Identification of faults and other local scale structural features and consideration of their disposition are extremely useful in optimal drillhole planning, sub-surface geological interpretations and correlations, which in turn facilitate more realistic resource estimates and mine planning activities for subsequent mining operation in a smooth and predictable manner.

Keywords: Regional structure, Ground Geophysical Survey, Total Magnetic Intensity (TMI), Fault.