WORK AT KTH ON INCLUSION CHARACTERISTICS TO ENABLE AN IMPROVED STEEL QUALITY DESIGN

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Work at KTH Royal Institute of Technology (Stockholm, Sweden) focusing on steel quality design (SQUID) with an emphasis on non-metallic inclusions is presented. Laboratory experiments have been carried out to study the influence of ferroalloys on the inclusion content[1-4] and clusters[5] in steels using the 3D electrolytic extraction method in combination with SEM and EDS. Moreover, experiments have been carried out to determine how the lime dissolution into slags can be improved[6] and how the slag penetration into refractories can be decreased[7]. In addition, plant trials have been carried out to determine the inclusion characteristics in steels. Studies of the influence of the top slag composition of the steel and treatment times on the inclusion characteristics during vacuum degassing has shown that too long treatment times can lead to an increase of the oxygen and inclusion contents.[8-10] Plant trials have also been carried out to study the influence of the final stirring during the vacuum treatment on the inclusion characteristics. The results show that it is possible to lower the amount of especially large inclusions by lowering the gas stirring intensity during the final vacuum treatment period.[11-13] Initial studies have also been carried out to use on-line methods such as the pulse distribution analysis with optical emission spectroscopy (PDA/OES) method to determine the inclusion characteristics in steel under industrial conditions.[14-16]

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