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Automatization of Manual Operations in the Continuous Casting Process

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Synopsis :

In the operation of the continuous casting process, incidental operator's work in the environment of high temperature and in the treatment of heavy materials have to depend on skilled workers even now. In the continuous casting shop of Kawasaki Steel, recently the following four techniques for incidental operator's work have been developed to avoid such hard work: (1) Installation of a cable and pipe auto-coupler for the ladle on the swing tower; (2) Installation of an immersion nozzle changer for the tundish on the tundish car, where the hot nozzle is changed by using remote control; (3) Installation of setting equipment of the coolant in the mould to avoid the mixing of two different components of steel; (4) Installation of an automatic sampling machine for hot slab in the slab treatment yard, where a sample for component analysis can be taken automatically. All units of these above-mentioned equipment are employed in a good condition now, and have achieved successfully a decrease in the number of operators, safety and the high rate of operation.

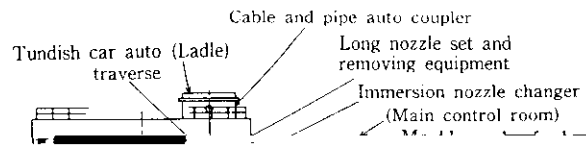
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Synopsis:

In the operation of the continuous casting process, inci-



1

At an initial stage of the automatization of this work, actual operations were analyzed and the automatization

fer car which is connected to the existing tundish car, because this type is considered to be better for operation

surface of the attached part the arm rotates in a fixed _____ 15 Operation

locus along with the movement of the carriage.

(2) Hand Device

The hand which extends the immersion nozzle is

The measurement of necessary operating time after start-up of this equipment is shown in Fig. 7. This shows

Old tundish

Stop casting

New tundish

Stop heating tundish

size of the coolant or immersion nozzle for the easy inserting into the mould.

5.1. Structure and Specifications of Equipment

Structure
(Movable)


 Driving unit

Table 4 Sampling time*1 of hot slab sampler (sec)

Temperature of slab