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Development of Automatic Charpy Impact Testing System

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Synopsis :
An automatic Charpy impact testing system has been developed for the Mechanical Test Center at Chiba Works, Kawasaki Steel Corporation, and is operating successfully. The new system has various functions such as the rapid control of temperature of specimens, automatic transfer of specimens from cryogenic bath to anvil, self-check function of test values and so on. The features of this system are as follows. (1) Automatic continuous impact testing has been successfully completed. (2) The test result has been fed back promptly to process management by linking the system to a host computer. (3) The SCARA robot provides the rapid transfer and setting of specimens with high accuracy. This report explains the specification and constitution of the automatic Charpy impact testing system, together with the results of the performance test on the specimen-transfer robot to be specially used in many developed apparatus.

The body can be viewed from the next page.

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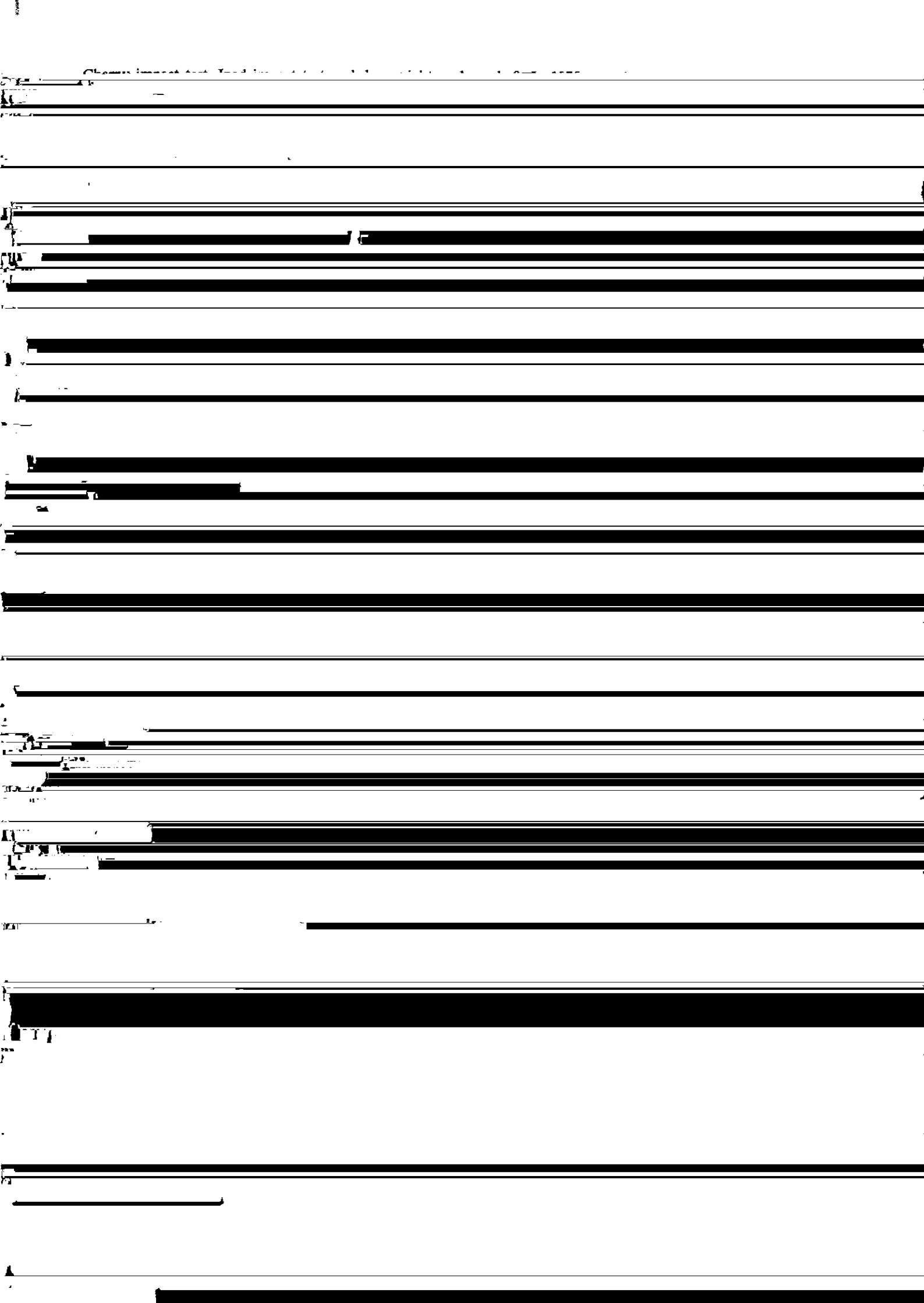
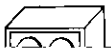
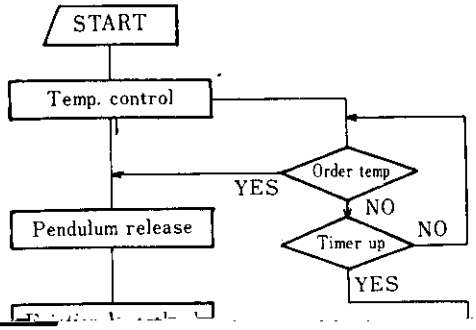


To fully automate the testing work, it is necessary to





5.1 Examination of Specimen Grip

5.1.1 Specimen grip mechanism

The parallel-chuck mechanism was adopted in order to meet changes in the specimen thickness. The parallel-chuck mechanism adopted is of a three-point grip type in which the specimen is seized at the notched portion and at two points opposite to it. In this type, the notched portion of a specimen being seized coincides

manner. As shown in **Fig. 3**, a hole 2 mm in diameter and 27.5 mm in depth was made in the specimen from

the requirements of the standards as the material for specimen grips. In actual specimen transfer robots, a

inserted and the hole was sealed so that the refrigerant did not come into direct contact with the tip of the thermocouple.

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5.2 Examination of Construction of Robot

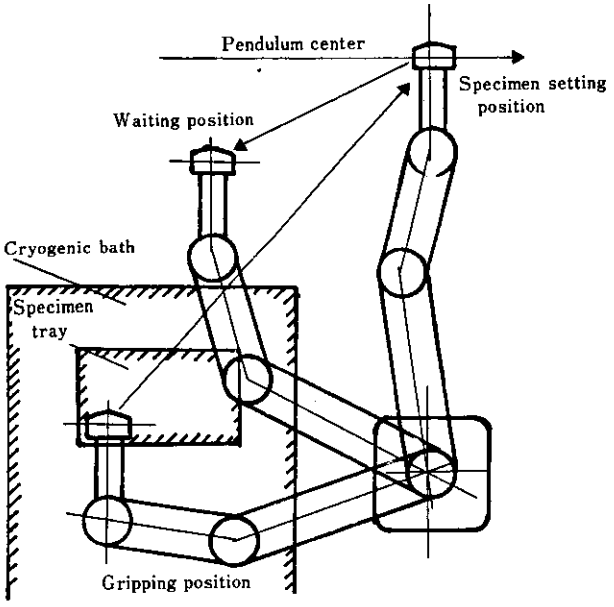


Fig. 6 Motion of transfer robot

bath to the anvil to about 0.6 s.

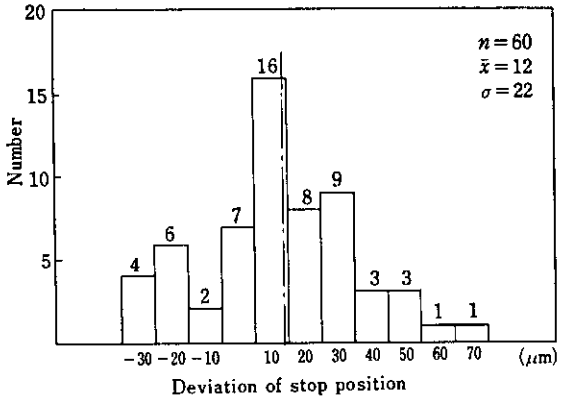
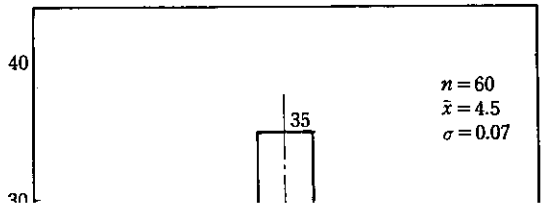


Fig. 7 Reproducibility of stop position of transfer robot grip



possible to reduce or omit input operation for test conditions, transfer operation for test results and hostcom-

Nippon Kaiji Kyokai (NK) and was authorized by the ASTM.