2. Main Equipment of JWI-CIF[2]

Verification of integrity by experiments using full-scale structures that approximate actual structures is indispensable. The general practice is to conduct a fracture mechanics evaluation using the properties obtained by a small-scale test. However, this fracture mechanics approach is based on the results of extensive e8fnj 65 >> BDC 0 Tc 0.017 Tw 0 -1.33 TD [(man)40 (y ne)14 (w pr)34 (oducts including steel pla)29 (tes f)40 (or sh
Using this equipment, it is possible to perform brittle fracture experiments by applying loads equivalent to those of actual ships to large-scale heavy steel plate specimens and actual structural samples. This facility is mainly used for full-size fracture tests (large-scale structural model tests, ultra-wide duplex ESSO tests, etc.) in which the specimen size exceeds 900 mm.

The JWI-CIF[2] also has a 20 MN and 12 MN tensile testing machine, which are mainly used for tensile testing relatively small specimens, approximately 500 mm in size. The type of test is, for example, the deep notch test (brittle fracture initiation test), ESSO test (temperature-gradient type brittle fracture propagation/arrest test), CAT test (isothermal type crack arrest test), etc.

2.2 Large-Scale Testing Machines for Line Pipes

In the line pipe field, evaluations simulating the various risks that can occur through the time of pipeline construction to the service period are necessary. For

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example, in buried pipelines in seismic hazard zones, buckling or rupture of the line pipe is possible due to large permanent ground deformation accompanying liquefaction or landslides. In order to evaluate integrity against fracture under those conditions, the JWI-CIF^2 developed a large-scale pipe bending machine which

propagation/arrestability of heavy plates and welded structures, mainly for the shipbuilding field. Even if a brittle crack initiates in the hull and propagates over a long distance, it is necessary to prevent catastrophic destruction by stopping, i.e., arresting the crack during propagation in the middle of the hull. For this reason, the arrestability of brittle cracks is extremely impor- tant. Because the steel plates used in the tops of con- tainer ships have been getting thicker and recently reached 100mm, a large test load capacity is required in tensile testing machines. Moreover, since the distance between the two loading pins is as long as 10, stress waves generated at the time of brittle crack initiation can be prevented from interfering with the test speci- men, so that the arrestability of long brittle cracks can be evaluated under the same conditions as in actual ships. JFE Steel is contributing to the safe navigation of ships by the development of a structural arrest tech

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