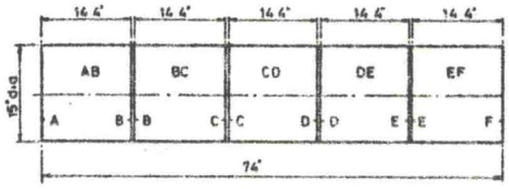

FIG. 5(a) INITIAL CUTTING DIAGRAM

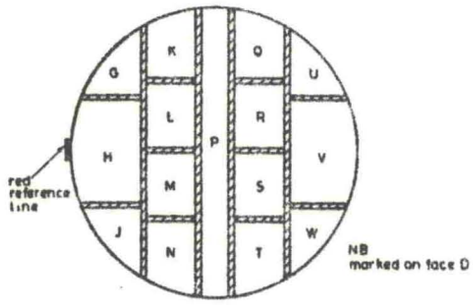

FIG. 5(b) CUTTING DIAGRAM FOR SECTION DE

from each end. The material was originally rather coarse grained, and the suppliers gave the entire core a refining heat treatment in a vacuum. This consisted of heating slowly to 610°C, soaking for 1 h at this temperature, and then cooling, still within the vacuum, over a period of about 18 h.

Figure 5 shows the manner in which the material was cut up. All the tests reported in this paper were performed on material from section DE at a test temperature of 400°C. Also shown is the way this section was further cut up.

Chemical analysis was carried out on four samples taken from pieces J, M, R, and U. Table 1 shows the results of these analyses.

Microscopic examination of the grain structure in both the longitudinal and transverse directions showed that the grains were orientated randomly, which suggested a minimum of anisotropy and difference in directional properties.

TEST PROGRAM

The creep tests at 400°C on section DE of the steel have in general not exceeded 3,000 h. Eight torsion creep tests have been completed at shear stresses ranging from 6.5 to 10.5 ton-ft/in.^{2}, while another test at a shear stress of 11 ton-ft/in.^{2} is still in progress. To date, six tension creep tests covering the nominal stress range 12 to 17 ton-ft/in.^{2} have been taken to 3,000 h. Finally, seven pressure creep tests on cylinders are reported, with internal pressures ranging from 8 to 13 ton-ft/in.^{2}. Tables 2, 3, and 4 show details of these tests. Included in the tables are the initial plastic strains associated with each stress or pressure level. Because of the difficulty of measuring the instantaneous strain at the moment of loading, the initial plastic strain is taken as the nonelastic strain that occurs up to 1 min from the instant the test load or pressure is applied.

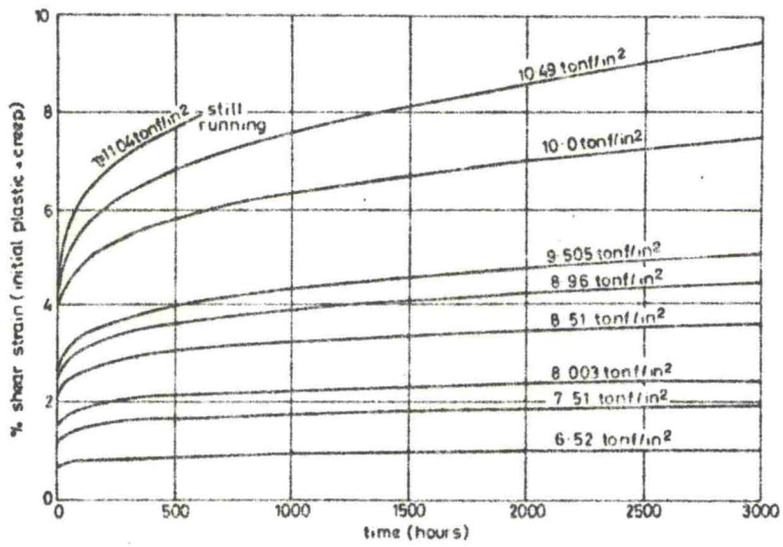

FIG. 6 TORSION CREEP CURVES FOR 0.18 PERCENT CARBON STEEL AT 400°C