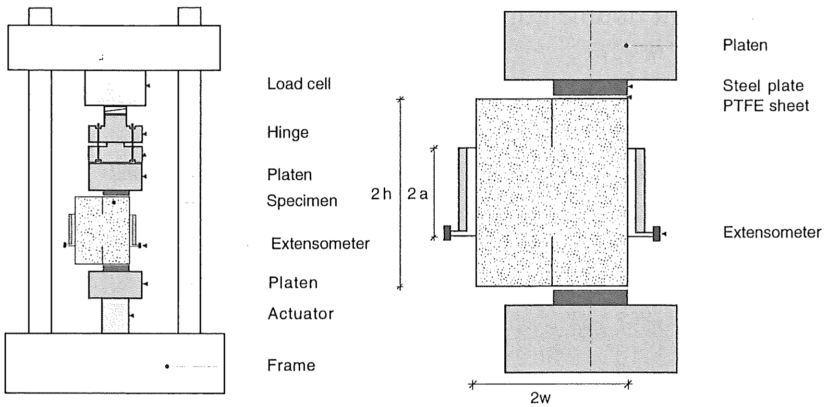

Figure 1. Testing arrangement, geometry and boundary conditions. (a) General view of the testing arrangement. (b) Geometry and instrumentation of the specimen

Table 1: Dimensions of the specimens

Sample	Height, *2h* mm	Length, *2w* mm	Ligament, *2a* mm
H75	75	56.25	37.5
H150	150	112.5	75
H300	300	225.0	150

2.2 *Experimental procedure*

Figure 1 shows the testing arrangement of the double-notched specimens of concrete under compression loading. Two ground and smooth steel plates were put between the machine platens and the upper and bottom faces of the specimen to apply the compression load; the thickness of these steel plates was 10 mm. To eliminate the friction between the steel plate and the concrete a PTFE sheet was introduced, the thickness of the PTFE sheet was 0.2 mm. Between the upper platen and the load cell there was a hinge. Initially a small compression load was applied over the specimen with free rotation hinge; then the hinge was fixed and the whole test was developed with the hinge fixed; in this way it is guaranteed that the compression load is uniformly applied over the whole surface of the steel plates. During the tests the following parameters were recorded: the load P, the displacement of the actuator, the elapsed time and the relative displacement of the points situated at height of the tip notches on the lateral vertical faces of the loaded and unloaded parts of the specimen, see figure 1 for details.

A face of the specimen was covered with a thin film of fluorescein, this product changes his color when the crack opens and the water goes out of the concrete. The map of cracks was plotted along the test and the order of the cracks appearance was established.

The tests were performed in actuator displacement control, at a rate of 0.04 mm/min until 70 percent of the 'oad corresponding with the detection of the first cra :k and 0.02 mm/min until the end of the test.

3 EXPERIMENTAL RESULTS

3.1 *Trajectories of the cracks*

Figure 2 shows the crack trajectories of the double-edge specimens, before the compression failure of the loaded part of the specimen. This figure shows, for two specimen sizes, the crack path of the trajectories in the face of the specimen that was covered with a fluorescein film. All cracks started on the corner of the notch tip that is the most distant of the loaded part of the specimen and grew towards the unloaded unloaded part of the specimen describing a curved path, as it shown in figure 2. The curved path corresponds to a stable growth of the cracks. In some tests a light branch out of the crack was observed.

Figure 3 summarizes a series of consecutive photos showing the sequence of appearance of the cracks on the face of the specimen covered with a thin film of fluoresceine, from the firsts on the notch tip until the compression loading failure of the specimen. This figure shows that two groups of cracks appear along the test: the cracks caused by the shear loading, and the cracks caused by the compression failure. As it observed in the sequence of photos, the cracks caused by the shear loading appear firstly; they are initiated at the corner of the notch tip opposite to the loaded part of the specimen and they grow towards the unloaded part following a curved path, approximately symmetric in the upper and bottom notches. These cracks grow in stable manner until that the compression failure cracks appear. The second photo shows the initiation of a compression crack in the loaded part when the shear cracks have an important length. Since the compression failure governs the failure of the specimen, the shear loading cracks are non completely developed when the specimen colapses, that is the shear cracks do not completely separe the unloaded part of the specimen as a free body. The final photo of the se-