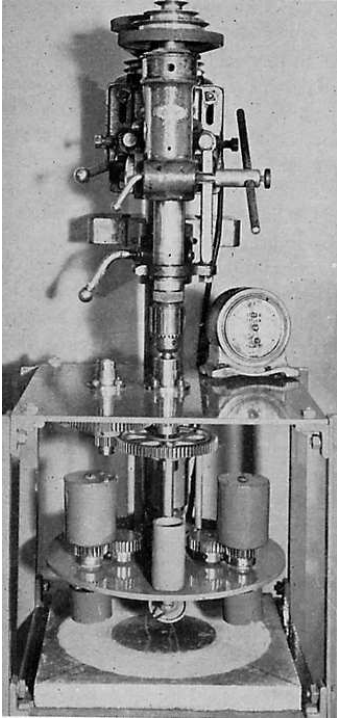


Appendix U.5.14 – Scripture’s Revolving Discs

Generic Name of Test	<i>Sliding Fine Abrasive : Abrasion Test</i>				
Principle of Test	Loaded rotating steel discs moving in planetary circuit cause abrasive to slide/roll over specimen				
Historic Development of Test	This test was developed by Scripture to evaluate the influence of different aggregates on the wear resistance of concrete floors. The apparatus used was patterned after a similar apparatus developed by Schuman and Tucker (1939) for the National Bureau of Standards. The test is in all probability the immediate forerunner of the ASTM C779 Proc A test (1971) [Scripture (1954)]				
Apparatus and Abrasives	Three flat rotating steel disks are attached to a larger rotating planetary disk. An electric motor powers the machine, which produces an annular abraded area on the concrete. A No.60 silicon carbide abrasive is used [Scripture (1954)]				
 <p data-bbox="841 982 1227 1157">Figure U.5.14.1 Apparatus used by Scripture. Note similarity to a subsequent model used in ASTM C779 Proc A (1971), and also an earlier apparatus used by Schuman & Tucker (1939) [Scripture (1954)]</p>					
Test Method	The test specimens (305 x 305 x 51mm) were profiled with a bridge micrometer and subjected a 5-minute abrasion period in order to remove laitance. After this a 30-minute abrasion test was performed [Scripture (1954)]. The rate of rotation was not specified.				
Abrasion Wear	This is measured as the average depth of abrasion wear. [Scripture (1954)]				
References	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;"><u>Author</u></td> <td style="width: 50%;"><u>Comment</u></td> </tr> <tr> <td>Scripture (1954)</td> <td>Source document</td> </tr> </table>	<u>Author</u>	<u>Comment</u>	Scripture (1954)	Source document
<u>Author</u>	<u>Comment</u>				
Scripture (1954)	Source document				

Wear Mechanisms according to Author

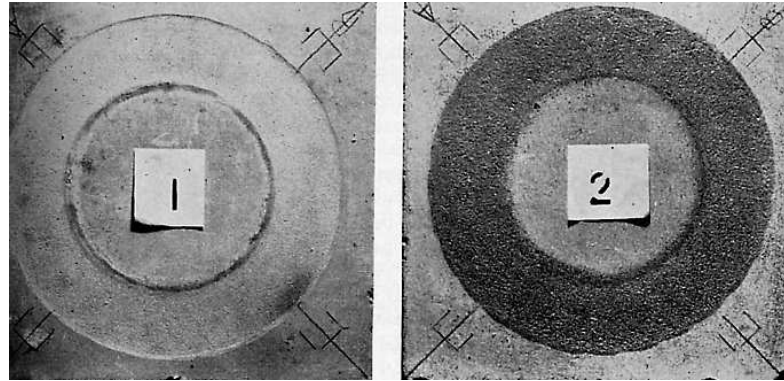
(i) Scripture (1954): No comments made on the mechanism of abrasion.

(ii) Visual Effects:

Figure U.5.14.2

Typical test slabs after the abrasion test.

Specimen 1 contains mineral aggregate while specimen 2 contains iron aggregate [Scripture (1954)]



Wear Mechanisms according to writer [R2 S2 I0]

General comment on aggregate pullout: The combination of disk rotation and planetary motion means that in this test any loosened aggregate particles can be spun out at the advance end or the rear end of the rotating disks as they move forwards along their planetary circuit. This is discussed in more detail in U.5.15

(i) Rolling and Sliding:

The mechanism of wear is one of microscopic crushing and/or shearing at the contact points, as the sand is made to move laterally beneath the specimen. The sand will both slide and roll. The predominant action in the case of sliding will be shearing in the form of scratching, scraping and cutting of the asperities. In the case of rolling, sharp points are likely to generate high compressive stress, resulting in microscopic crushing in very localised areas. These wear mechanisms are illustrated in figure U.5.14.3

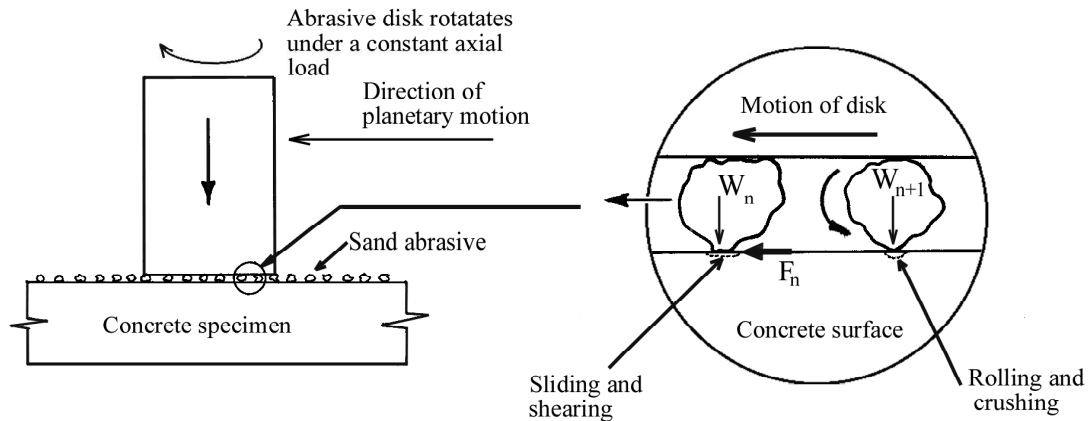


Figure U.5.14.3 Rolling and sliding wear

(ii) Adhesion and deformation: See note 1 in introduction to appendix U