

The specifications for boots and shoes issued by the New Zealand Standards Institute establish a minimum thickness for the sole of each type of footwear. This implies that wear value is related to thickness—*i.e.*, for stronger wear a higher thickness is specified. In other words, wear per unit thickness is one way of designating the real quality of sole leather. Now, if the sole made from a piece of hide is made thicker by one process than by another without increasing the wear life of that sole, then the real quality of the thicker sole is less than that of the thinner one, as the wear per unit thickness is less.

It has been found as a result of actual wear tests in New Zealand that rolling does not affect the wear life of a sole, but does reduce the thickness. As the wear life remains the same, the wear per unit thickness is increased by rolling, or, in other words, the quality is increased. One aspect of quality is therefore bound up in the reduction of thickness produced by rolling. So far it has not been possible to obtain any reasonable indication of the reduction of thickness produced by rolling from compressibility results. As the weight of hide substance in a piece of leather will not appreciably alter by being rolled, the weight of hide substance per unit thickness will be increased in proportion to the change of thickness produced by rolling.

One suggestion has been made, therefore, that a test for quality of sole leather might be the weight of hide substance per cubic centimetre of leather. The implications of such a test are very far reaching, involving the original raw hide and all the tanning processes which may affect the thickness of the finished leather. The results so far obtained by the application of this suggestion appear to fit in with the results of actual wear tests. They also provide a reasonable explanation for at least the greater part of the extra wear which is given by chrome sole leather.

*Field Trials.*—As stated above, any quick test which may eventually be adopted to determine the quality of sole leather must be correlated with the results of actual wear tests. In order to provide the necessary data for this to be done, field trials are essential. These have been carried out during the past year, and the thanks of this Association are due to the Army Department and to those persons who have co-operated again in this important work. The tests are of necessity very slow, but results are being obtained which are of great value in establishing those processes which affect the real quality of leather. As stated above, one result so far obtained is that rolling does not affect the wear life of a sole, but does affect its real quality.

*Effect of Perspiration on Upper Leather.*—The very difficult problem of how to minimize, if not prevent, the rotting action of perspiration on upper leather has been the subject for many investigations overseas. The composition of perspiration varies considerably with the health of the individual and the nature of the conditions which produce excessive perspiration. Another factor which is of great importance is the fitting of the shoes. Of the many shoes examined the uppers of which have cracked during wear, the majority have been associated with too tight a fit. Such tight fitting not only increases the amount of perspiration produced by the foot, but also imposes greater strains on the leather, which will crack more readily when weakened by perspiration. Results have been obtained in the laboratory tests carried out during the year which are now being tested in actual service. As with the wear trials, these field tests require a long period to carry out, and until laboratory and wear tests are correlated no definite conclusion can be established.

*Hydraulic Washers.*—The tunnel for the hydro-electric scheme at Lake Tekapo is being cut by hydraulic rams, which work under a pressure of 6,000 lb. per square inch. Ordinary hydraulic washers failed, because the oil which was used in the rams dissolved out the wax which was used to impregnate the leather and so make it impervious to the oil. It was necessary to find a wax which was only very slightly soluble in the oil under the conditions of working. This has been done, and also a more suitable type of leather has been substituted for that which was being used. The first set of washers made along the lines suggested has given very satisfactory service and are still in use.