

shore side, and that our inspection would have to be made from the plates on the reverse side of the fence.

The panels facing the ocean and exposed to the action of the storm exhibited a variance of results. Some had been painted with pigments having a greasy nature, and being natural water-shedders were apparently dry, while others, painted with less greasy pigments, held on their surface a large number of rain drops. By wiping off these rain drops, the following differences were noted:—

(1) That in some cases a place resembling a water blister was left, showing just where the drops had remained on the surface, and showing that they were acting upon the paint coat.

(2) In other cases, when the drops of water had been wiped off, the surface was in the same condition as the balance of the plate, and the rain had no apparent effect upon the paint coat. On some panels, the penetration of moisture through the paint coat left a blotchy surface. This appearance being present on many panels, a record of impenetrability was obtained.

Very few corporations, whether manufacturing paints or buying paints, and very few engineers or architects have the facilities or the time to make exhaustive laboratory research when choice is to be made of a protective coating for their use.

What the practical man—either the paint manufacturer, the architect, or engineer—requires, is to have some practical result, easily obtainable, which will give him, in a definite and visible manner, a criterion and measure of the value of the new discovery, and of the refined laboratory work.

This accelerated field test consists in subjecting strips of any particular kind of steel that may be chosen to an atmosphere of maximum humidity, the steel being in intimate contact with the materials concerning which results are desired.

The apparatus is extremely simple, and the test can be started at thirty minutes' notice by any manufacturer, architect or engineer, at his office desk, and can yield him visible results in two days thereafter.

The idea was original with Dr. Cushman, and permission was requested from him to work it up in some practical way for the manufacturers of the raw materials and of paints, and for the consumers who have the work of protecting structural steel.

The chemist, engineer or architect who wishes to conduct this test on actual paint products instead of the materials used in the manufacture of paint products, may use a \$7.50 centrifuge apparatus made by Bausch & Lomb, in other words, a small laboratory centrifugal machine holding test tubes.

Number the test tubes for reference purposes and place in each test tube a small sample of the paint to be tested, together with a large quantity of benzine. It is of extreme importance to add the benzine in considerable quantity and previous to inserting the tubes in the centrifugal machine.

Actuate the apparatus and most of the vehicle will be thrown away from the pigment and the pigment will settle towards the bottom of the tube.

Decant or pour off the oil, add more benzine, thoroughly shake and pour off the liquid. Do this two or three times until the oil has entirely left the paint and nothing remains but the dry clean pigments.

Then take the pigments and proceed with the whole test as described below for the testing of dry pigments.

The materials required are as follows:—

An ordinary deep cigar box.

2 or 3 sheets druggists' thick filter paper.

1 dozen thumb tacks.

1 dozen safety razor blades (unless some special steel is to be tested).

$\frac{1}{2}$ dozen small butter dishes or saucers.

Each of the dry materials to be tested.

A clean pencil for stirring.

A pocket knife.

A glass of water.

An old towel or rag for cleansing hands, pencil, etc.

A piece of emery cloth.

A tooth brush.

2 or 3 test tubes.

Line all six interior surfaces of the cigar box with the filtering paper, using the thumb tacks for the purpose. Thoroughly wet the lining of the cigar box with water and stand it on one edge so that when it is ready for use it will be free from drip.

Place upon a piece of filter paper, large enough to cover the hand, some of the material under examination, add a few drops of water and rub up with the finger into a rough soft paste, this being easily accomplished with nearly all pigments, and bringing into a paste many pigments which are otherwise extremely difficult to incorporate with water. Be particular to cut the surface of the razor blade to the raw steel with "oo" emery paper, to insure the removal of any lacquer or surface treatment of the blade. It is necessary to handle the razor blades by the edges so as not to get any finger marks upon the surface. Now place a clean razor blade upon the plate, fold over the filter paper on each side of the razor blade in such a manner as to completely cover it with paste-coated filter paper, and place blade, paste and paper upon a butter dish within the cigar box.

Treat each sample of material under test in the same manner.

A word of caution is necessary regarding the testing of the inhibitives such as the chrome soaps, that are soluble in linseed oil.

These are not pigments, but soluble in oil and vehicle constituents, and therefore must not be applied in a water paste, but in a film, through the agency of benzol.

In the case of these materials, soluble in linseed oil, such as resins and linolates, these are to be dissolved to a heavy solution in benzol, and a coating poured upon the razor blade. The evaporation of the benzol leaves upon the surface of the blade a thin film of the material to be tested, and, because of the fluidity of the benzol and consequent thinness of the film, a second coating is advisable. The coated blade is then to be placed in a butter dish within the box along with the other materials with which it is to be compared. Care should be taken that the plate is completely coated as there is a tendency for the liquid to segregate on the steel.

If a strip of steel in every case be treated with potassium bichromate in such a test, a convenient standard of minimum corrosion will be afforded, for purposes of comparison.

If so desired, in the foregoing test the operator may increase the quickness with which the test may be performed, by adding to a little bicarbonate of soda (baking soda) on a butter dish, a little sulphuric acid. An evolution of carbonic acid gas will ensue and as this gas rapidly stimulates corrosion, its presence will render the test still more positive.

A considerable degree of refinement and a fair index of result can be obtained from this apparatus if the strips are first carefully weighed in a laboratory balance, and then reweighed after the steel is scrubbed with a tooth or nail brush to remove any rust formed, in which case the loss in weight of the steel is the measure of the rust formed and the degree to which the pigment has stimulated rust.

It is evident to any man who will compare the conditions in this test with the field conditions, that practically all of the important factors which contribute to the corrosion of steel are present in this test in such a way, that they will indicate in a short time the results which would be obtained from the steel painted with a paint coating produced from these materials and over a considerable length of time.

After the proper selection of pigments has been made, the question of vehicle must be carefully considered. The addition of high grade fossil resins, carefully compounded with a carefully treated oil, adds greatly to the power of a