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01.2.1996
scm/ri a-2732

Test Report No. A 0262.732
Fluidtightness Measurements on Densiphalt surfaces at Filling Stations

1. GENERAL INFORMATION

On 9.11.1995 the Doctor-Engineer Gauer Institute received instructions from the firm Vogtländische Straßen-, Tief- and Rohrleitungs GmbH, Rodewisch (STR) to carry out fluidtightness tests on filling station forecourts of Densiphalt. Densiphalt surfacing is a semi-rigid coating which combines the flexibility and jointlessness of asphalt with the load-bearing capacity and resistance to wear of concrete. The coating consists of an even-grained asphalt with a high percentage (25 - 28%) of hollow spaces and a thick binder around the filler. The hollow spaces are filled with the special Densiphalt liquid mortar until the cavities of the whole asphalt structure are completely filled[1].

Because of its resistance to oils and fuels Densiphalt coating is suitable for filling stations. The proof of fluidtightness on filling station forecourts is particularly important because of the risk to the environment around petrol depots and pumps through soil and ground water pollution by fuel. It is not only important to show the suitability in the laboratory but also in real use. For such tests the Pressure Reduction procedure is suitable.

As instructed, the tightness tests were carried out using this procedure and documented photographically. Two testing sessions were conducted on 15.11.95 , one at the Esso filling station belonging to the firm Leu in Oberkotzau near Hof and the other at the fuelling point in the yard of the firm STR in Rodewisch.

[1] Coating description in accordance with manufacturer's instructions.

Three examples should clarify the assessment criteria.

- Diagram 1 shows testing of a completely airtight location. The surface shows no bubbling whatsoever inside the bell, under the high vacuum of -0,75 bar. The established vacuum can be maintained without any difficulty.

- Diagram 2 likewise shows a positive test result. Here, also, a vacuum of -0,8 is achieved. The slight bubbling on the surface inside the vacuum bell resulted from the escape of a tiny quantity of air from the pores of the coating.

- Diagram 3 shows the test result for an untight surface. Through the lack of airtightness so much air is sucked into the bell that not only bubbling but a build up of foam occurs. A further indication of the lack of airtightness is the fact that the attempted vacuum of 0,8 bar could not be achieved (Diagram 4).

3. ON-SITE OBSERVATIONS AND TEST RESULTS

3.1 Esso Filling Station in Oberkotzau

Diagram 5 shows an overall view of the site. The surface of the area around the pumps was to be tested. The structure comprises a 4cm layer of asphalt, 4cm of asphalt binder and a 4cm thick layer of Densiphalt on top. The coating appears as a smooth, unbroken surface. In some places the Densiphalt mortar shows hairline cracks in the surface which become particularly obvious when water is drying on the surface (Diagram 6).

Fluid tightness tests were carried out in three different places. The first test was carried out on the approach to the car-wash (Diagram 7).

Diagram 8 documents the test result. The gauge on the bell shows a pressure reduction to -0,75 bar. The isolated bubbles in the bell result from surface air pores in the coating and are not indicative of a lack of tightness. The coating tested at this location can be regarded as fluidtight.

For the second test the coating in the immediate vicinity of the pumps was selected. The area around the pumps is particularly heavily contaminated by spilt fuel. The starting point for the second test is shown in Diagram 9. Diagram 10 shows the result of the test. The gauge indicates a pressure reduction between 0,75 and 0,8 bar. Only small, isolated foam bubbles are visible on the Densiphalt surface inside the test bell. The test point is in an area of fine hairline cracks. The result leads to the conclusion that the cracks only run in the fine mortar layer on the surface and do not cause any porosity. In the case of this test the test area can also be pronounced fluidtight.

A third point was chosen in an area where surface roughness was clearly evident. This would prove that it is possible to perform a tightness test on an irregular surface structure using the test bell described previously. Diagram 11 shows the starting point of the test with the evacuated test bell. Even on the rough surface the sealing ring makes an airtight joint enabling the test area to be evacuated to -0,75 bar. Like the second test, the Densiphalt surface in the test bell only reveals isolated, small foam bubbles. The test area can be declared fluidtight.

3.2 Fuelling Point on the Business Premises of the Firm STR in Rodewisch

The STR firm's filling station is currently under construction. The coating around the pumps was only laid during the night preceding the tests. The Densiphalt mortar was not sufficiently hardened for the tests to be conducted. There was a danger of the freshly applied mortar being sucked out of the asphalt pores by the vacuum.

Some days previously Densiphalt was laid on the area in front of the car-wash, the so-called wash-standing. Diagram 12 shows the area tested. The test set-up can be seen again in this picture. In the foreground is the electrically driven vacuum pump which is connected to the vacuum bell by vacuum hose. Prior to testing the area was also wetted with soap solution. After this the test bell was introduced and evacuated. Diagram 13 shows the result of the test. Under a test bell pressure reduction of -0,75 bar there is no bubbling to be seen on the Densiphalt surface. The test result declares the test point to be fluidtight.

4. CONCLUSION

The fluidtightness of Densiphalt was tested within the remit of the order for the investigation from the firm STR. For this purpose fluidtightness measurements, using the Pressure Reduction procedure, were carried out on two selected projects, one already in use as the Esso filling station in Oberkotzau and one being built as the firm's filling station for STR in Rodewisch.

In conclusion, the Pressure Reduction procedure has established itself as very well suited to testing the tightness of Densiphalt coating. The procedure, which has also proved itself in waterworks and disposal site construction, allows the evaluation of coating fluidtightness in very short test times.

As a result of the fluidtightness investigation carried out, it is established that, in the regions tested, the Densiphalt coating can be described as fluidtight.

Head of the Test Station	Staff Member
Signature	*Signature*
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