CENTER FOR TRANSPORTATION INFRASTRUCTURE SYSTEMS
THE UNIVERSITY OF TEXAS AT EL PASO

Project Summary Report 0-5216-S
Project 0-5216: Development of Tack Coat Field Acceptance Criteria
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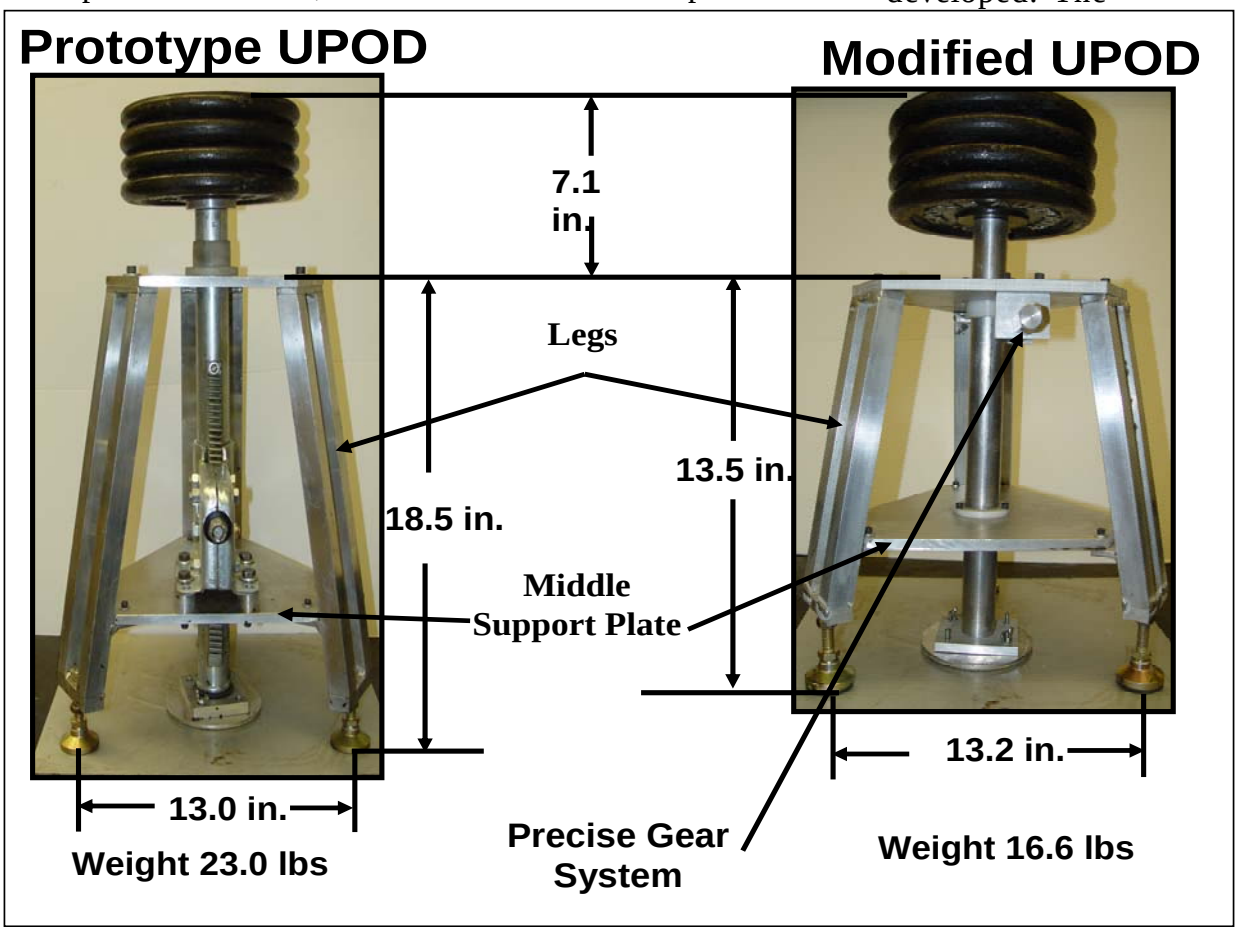
PROJECT SUMMARY REPORT

Tack Coat Field Acceptance Criterion

To evaluate quality of tack coat in the field, a UTEP Pull-Off Device (UPOD) was developed under project 0-4129 titled "Development of an Objective Field Test to Determine Tack Coat Adequacy." However, a field acceptance criterion was not developed. In addition, the prototype UPOD device was fabricated using off-the-shelf components; the device needed to be modified to make sure that the produced devices are reproducible. Thus, the objectives of this research were to develop a reproducible UPOD device and develop a field acceptance criterion.

What We Did ...

To achieve the objectives of this project, the prototype device was critically evaluated and a modified UPOD device (shown below) was developed. The



modified device is stable and weighs less. In addition, the developed devices are repeatable, as shown in the table (below). The statistical analysis of the data suggested that the measured strength is independent of the device, indicating that the devices are reproducible.

To develop a field acceptance criterion, a series of tests were performed. The tests were performed at 50, 77, 95, and 140 °F at two application rates of 0.04 and 0.10 gal/yd^2 and six set times of 10, 20, 30, 40, 50, and 60 minutes. The set time means after application of tack coat and not the break time. Three commonly used tack coat types (CSS-1h, SS-1h, and PG64-22) were evaluated.

What We Found...

A typical test result for CSS-1h tack coat type is shown in the figure (below). The test results suggest that the strength gain is dependent on the set time and test temperature (pavement temperature). The strength gain is nonlinear and rate of increase depends on the pavement temperature. Similar trends were observed for SS-1h and PG64-22 tack coat types.

Based on the test results and analysis, it was determined that nomographs can be developed for field acceptance of tack coat. Since TxDOT specifies the minimal residual rate of application to be 0.04 gal/yd^2, it was decided to develop nomographs using data collected at this rate of application.

If the measured strength in the field is less than the strength estimated using nomographs, then the tack coat should be rejected; otherwise the quality of the applied tack coat is adequate.

Table: Test Results for SS-1h, Tested at 136 °F

UPOD	No of Repetitions			Avg, psi	SD, psi	COV, %
	1	2	3			
1	1.59	1.59	1.59	1.59	0.00	0.0
2	1.62	1.56	1.69	1.62	0.07	4.0
3	1.71	1.78	1.78	1.76	0.04	2.3
4	1.68	1.84	1.61	1.71	0.12	6.9
5	1.82	1.75	1.75	1.77	0.04	2.3
6	1.51	1.51	1.65	1.56	0.08	5.2

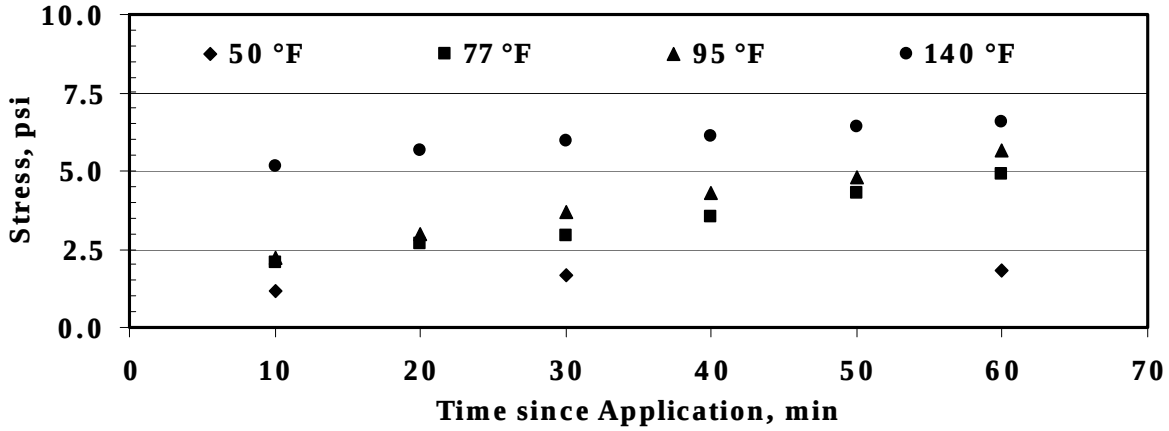
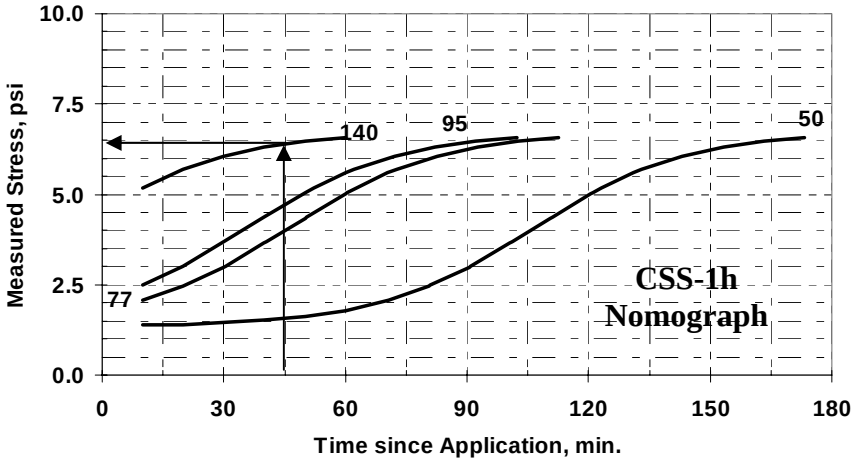


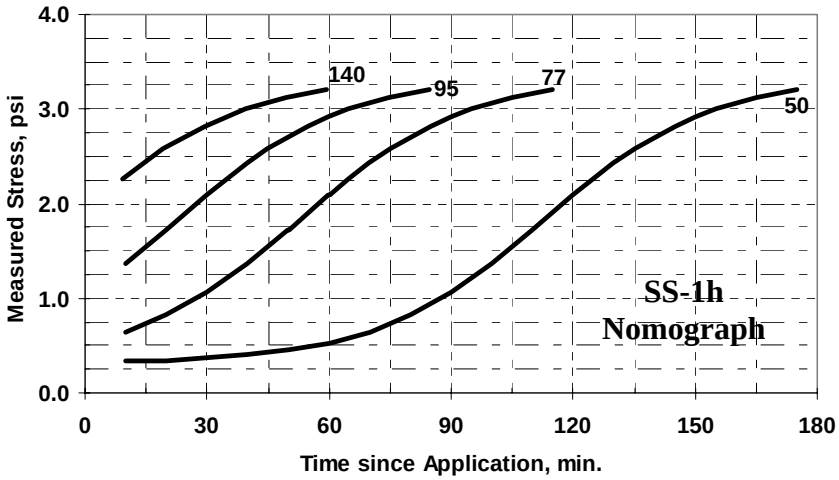
Figure: Test Results for CSS-1h Applied at 0.04 gal/sq. yd

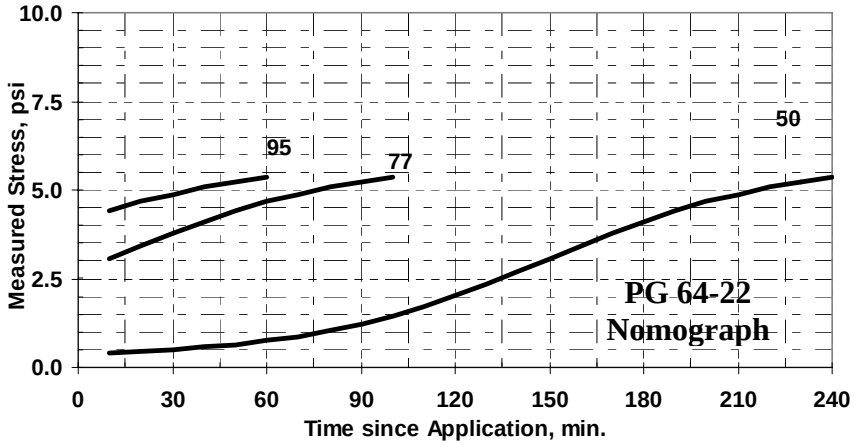
The Researchers Recommend ...

To evaluate quality of tack coat in the field, the following procedure should be followed:

- After contractor has sprayed tack coat at the appropriate rate of application, record pavement temperature and time of application.
- Wait for a set time of 10 minutes or more.
- Place UPOD (with contact plate attached) on top of the selected area.
- Lower the contact plate with the help of a torque wrench (clockwise direction) until it touches the pavement surface.
- Place 40 lbs of load on top of the UPOD.
- Wait for 10 minutes.
- Remove load from UPOD and raise the contact plate with the help of torque wrench (counter-clockwise direction) until the contact plate separates from the surface.
- Record peak torque and convert to strength using calibration factor.
- Estimate strength of the tack coat type using provided nomographs (*The nomographs are based on laboratory data since adequate field data was not available).*
- Compare measured strength with estimated strength.
- Reject tack coat if measured strength is lower than the estimated strength.







For More Details

The research is documented in the following reports:

- *0-5216-1: "Tack Coat Field Acceptance Criterion"*

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