

TO:	<b>ENGINEERING INSTRUCTION</b>		
	NEW YORK STATE DEPARTMENT OF TRANSPORTATION		
<b>SUPERSEDED BY EB 97-020 EFFECTIVE 4/4/97</b>	<b>SUBJECT:</b> BRIDGE TECHNICAL POLICY AND PROCEDURE <b>MANUAL:</b> THERMOGRAPHY FOR ESTIMATING CONCRETE REMOVAL FOR SLAB OVERLAY PROJECTS. <b>Subject Code:</b> 7.35-8		
	<b>Distribution:</b> 30 Main Office      32 Regions      Special	<b>Code:</b> 87-27 <b>Date:</b> 7/17/87 <b>Supersedes:</b>	
<b>APPROVED:</b> <i>R. C. Keating (by Jm)</i> DEPUTY CHIEF ENGINEER (STRUCTURES)			

In the opinion of both this office and the Technical Services Division, accurate determinations of hidden delaminations within monolithic concrete bridge slabs can be made by means of thermography.

Thermography is performed by means of truck-mounted devices. This allows data to be collected from a moving vehicle, thereby reducing maintenance and protection of traffic requirements to a minimum. Generally, a separate truck-mounted flashing board backing up the data collection vehicle is sufficient.

The two major considerations for structure eligibility are safety and cost. If the Region determines that the traffic conditions render the structure unsuitable for a standard combination delamination-potential survey, then thermography is a viable alternative, especially, if the only other alternative is to perform a visual survey. Visual surveys have proven to be highly erroneous on most occasions.

Cost data should be established by estimating the cost of thermography against the cost of a combination delamination-potential survey. However, it should be kept in mind that the combination delamination-potential survey will give a more accurate estimate than will thermography.

Costs associated with thermography vary directly with the square footage surveyed. The following costs may be used for estimating purposes:

<u>Square Footage</u>	<u>Cost per s.f.</u>
To 100,000	\$ .12
100,000 - 1,000,000	.11
1,000,000 - 2,000,000	.10
2,000,000 - 3,000,000	.09
Over 3,000,000	.08

In addition to the foregoing, there is a \$2000 mobilization charge per work order. However, a work order can encompass multiple structures. Therefore, it is economically advantageous to schedule as much square footage as practical for a given survey.

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Beside the safety and cost factors which will determine the use of the thermographic procedure, there are also environmental considerations which determine the effectiveness of the procedure. They are:

1. Data cannot be collected under overcast conditions. The minimum sunshine requirement is seventy-five percent (75%).
2. The structure to be surveyed must be exposed to direct sunlight for the following minimum time periods before data collection may begin:

April 1 to October 31 - 3 hr.  
November 1 to March 31 - 4 hr.

3. Wind conditions must be mild. If wind speeds reach, or exceed, 20 m.p.h. the procedure should not be done; or if it is in progress it should be stopped.
4. The structure to be surveyed must be dry.

There are two known limitations associated with the thermographic procedure:

- A. It is effective as an investigative tool only for bare monolithic concrete slabs. Experiments have indicated significant errors occur when the procedure is employed on asphalt covered slabs.
- B. It will only indicate actual delaminations existing at the time of the survey. Early signs of distress will not be indicated. Therefore, a delamination-potential survey will be required, during the contract work, to determine the final extent of concrete removal.

Accordingly, the estimated quantity of removal determined by thermographic procedures should be increased by 15% per year for every passing year between the time of thermographic survey and the time of proposed construction. This percentage increase allows for the expansion of known delaminated areas as well as the establishment of new ones.

Questions regarding thermography and its application should be addressed to:

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