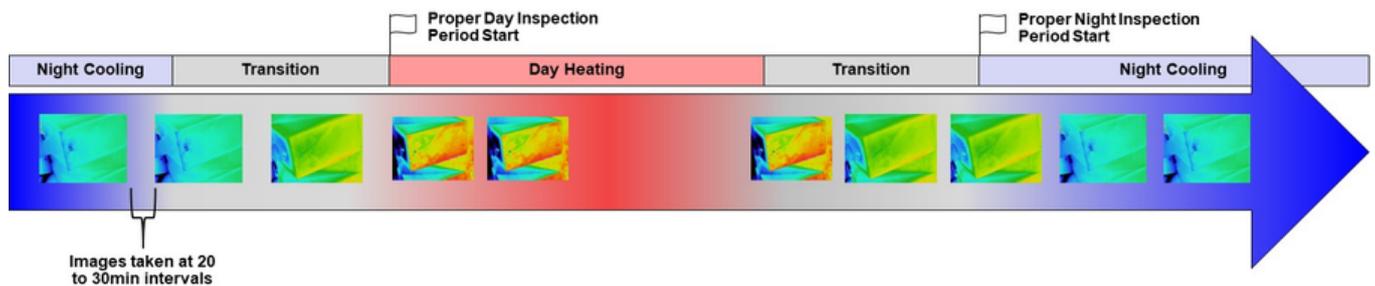


# Evaluating the Effectiveness of Infrared Inspection in Indonesia

West Nippon Expressway Company (NEXCO-West), the parent company of Nexco-West USA, is participating in a toll road PPP project in Indonesia, leveraging its experience as one of the largest toll road operators in Japan. As part of this project, extensive testing is being conducted to verify the effectiveness of infrared inspections for bridges in Indonesia's tropical climate. NEXCO-West USA participated in this project to support on-site investigations.



Temperature monitoring of known defects and specimens to identify applicable time windows

Indonesia has a rapidly growing infrastructure with many new bridges in need of inspection and maintenance, making the supplementation and acceleration of bridge inspection reports critical. By gauging the applicability of infrared data collection methods in three strategic locations on the island of Java—Bandung, Semarang, and Surabaya—NEXCO-West was able to initiate the drafting of data collection manual for infrared thermography in Indonesia.

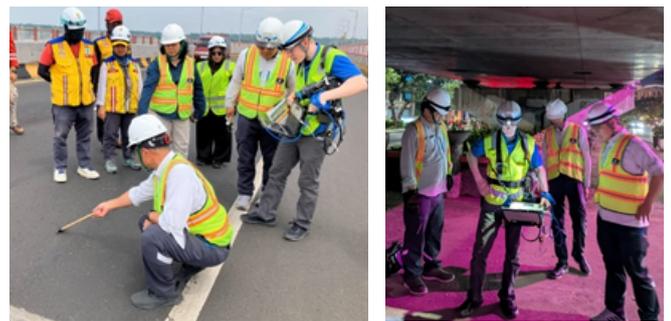
With a predominantly humid environment, our team believed acquiring accurate thermal readings would be a significant challenge to overcome. The team identified representative delaminations in target bridge deck surfaces, deck undersides, and piers then monitored them with thermography periodically to observe their behavior as they heated up during the day and cooled during the night. Fabricated concrete specimens with artificially delaminated centers were also mounted on the bridges and monitored periodically.

Based on time-based data comparisons and environmental conditions observed, our results indicated that thermographic detection of concrete delamination was effective, even during days with limited rise/fall of ambient temperature and recent rain events. The use of directly mounted test specimens (developed within the NEXCO-West group) was critical to determining recommended testing periods.

We hope that this project will strongly contribute to the establishment of criteria for future applications of thermography for Indonesia's transportation infrastructure and we are grateful to receive the kind reception and support of local transportation authorities to access their structures.



Growing national toll road network of The Republic of Indonesia



Left: Deck top data collection with NEXCO-West's IRT system validation at target bridges with cooperation from Indonesian government. Right: Deck underside collection by NEXCO-West's IRT system.