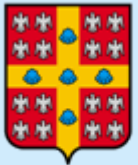


NRC-CNRC

*Industrial Materials
Institute*

Crack detection in HVOF coatings by ultrasonic vibrothermography.

Jean-Gabriel Legoux,
Jean-Marc Piau and Hakim Bendada



UNIVERSITÉ
LAVAL

Aujourd'hui Québec, demain le monde



LABORATOIRE DE
VISION ET SYSTÈMES
NUMÉRIQUES



National Research
Council Canada

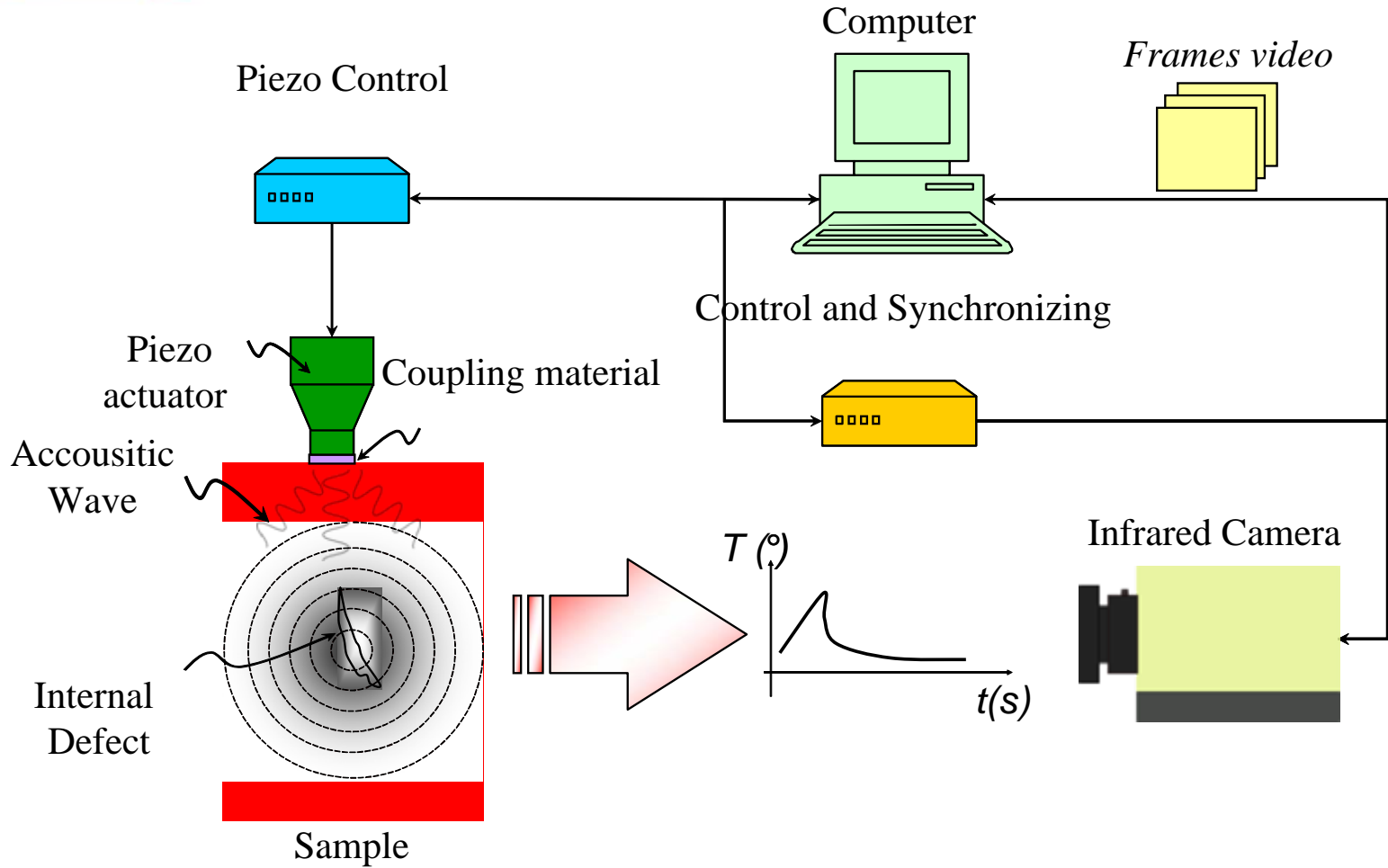
Conseil national
de recherches Canada

Canada

Objective

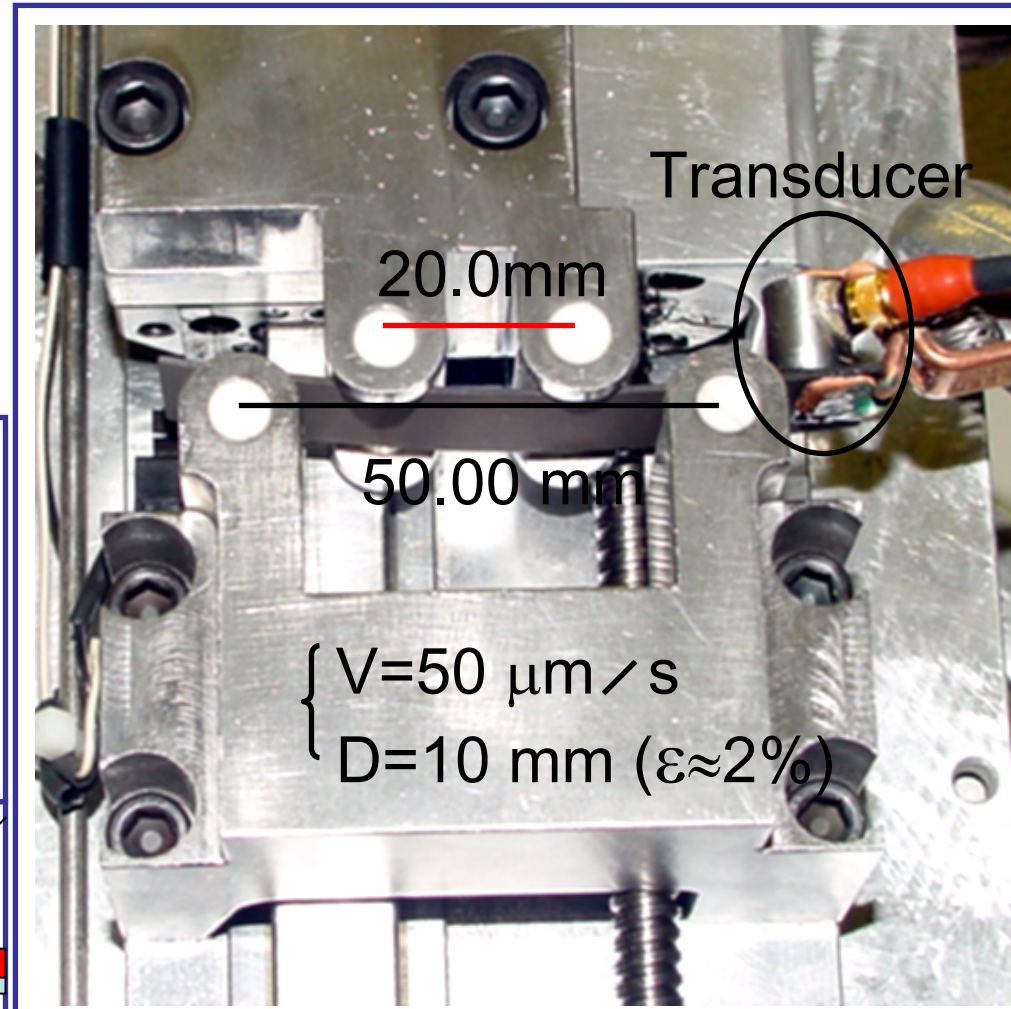
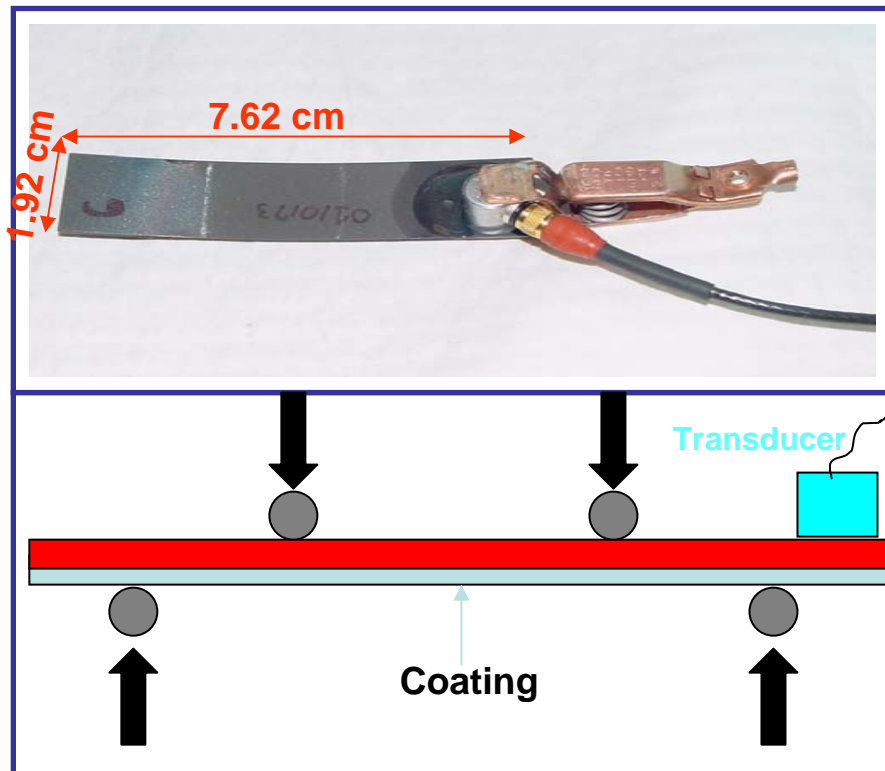
- To develop a non destructive inspection technique enabling the detection of closed cracks inside WC-HVOF coatings

Systeme et appareillage



Four-Point Bend Test

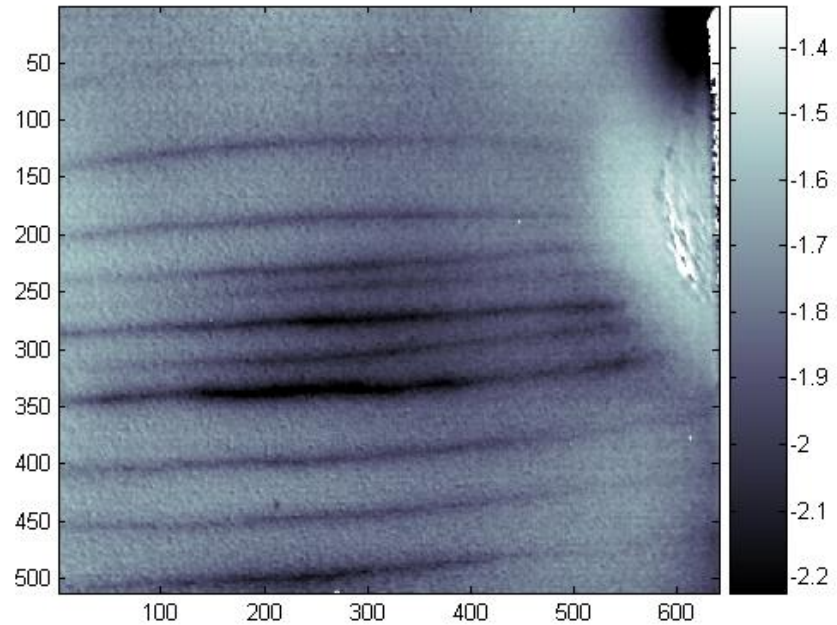
Performed by simultaneously applying a certain strain rate, measuring and analysing the characteristics of Acoustic Emissions.

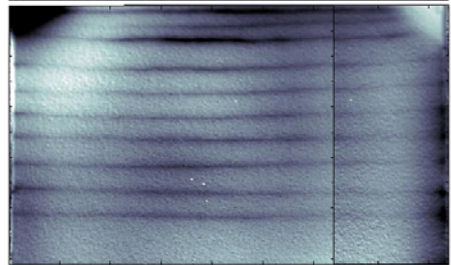
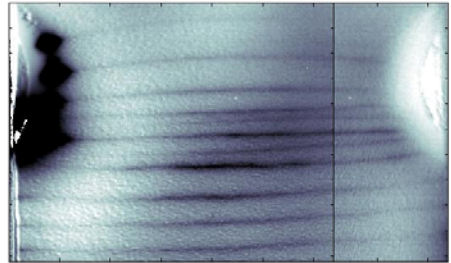
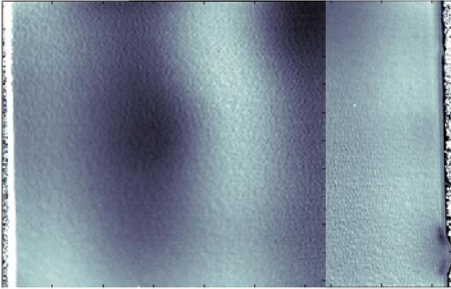
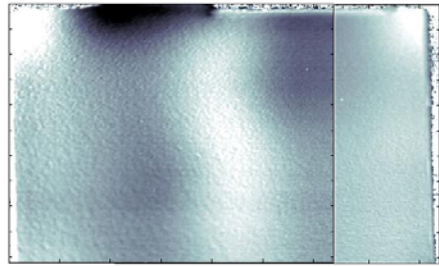


Under-Bending Test \Rightarrow Tensile Stresses

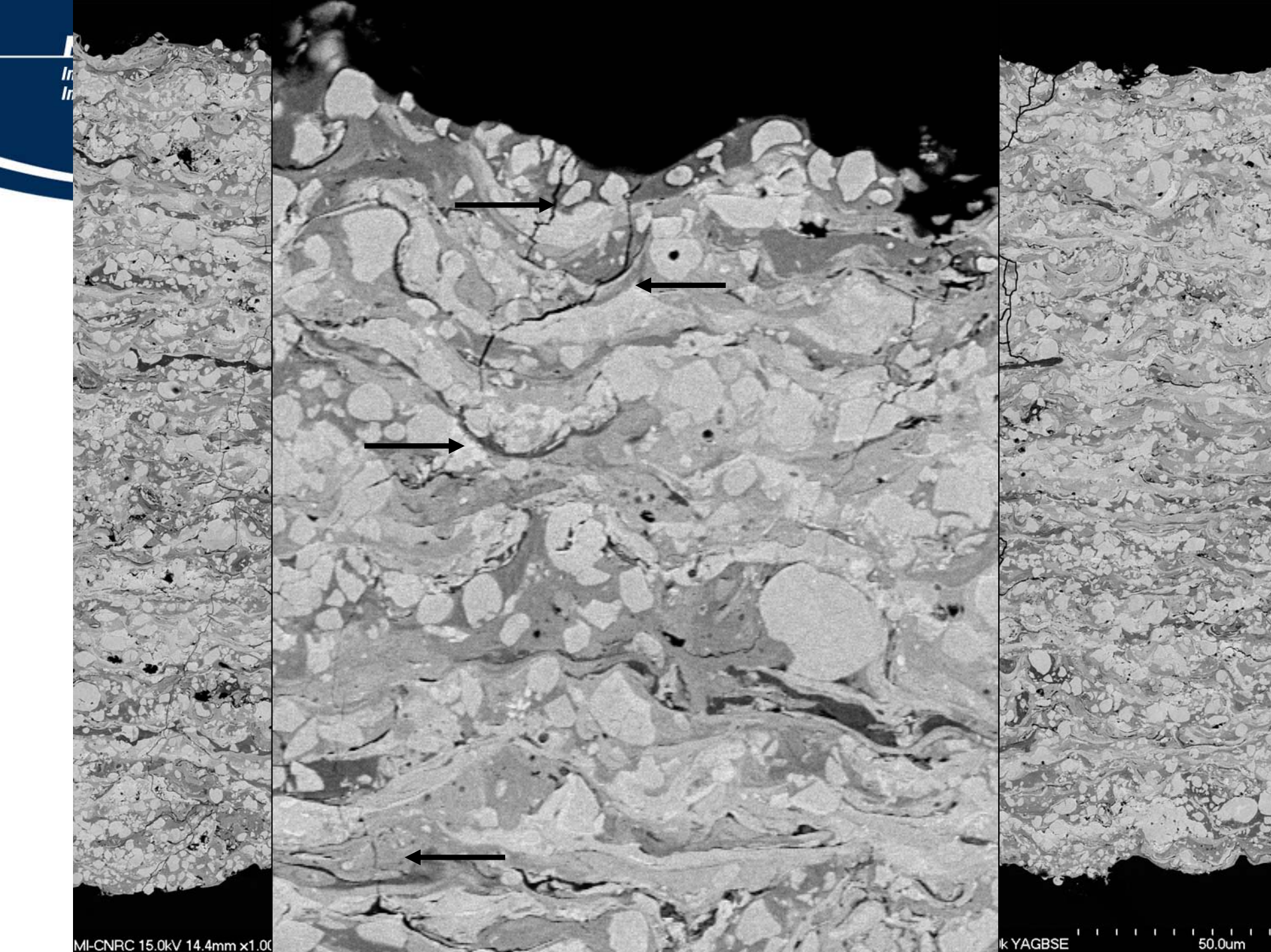
Détection de micro fissures

Tungsten Carbide Coating





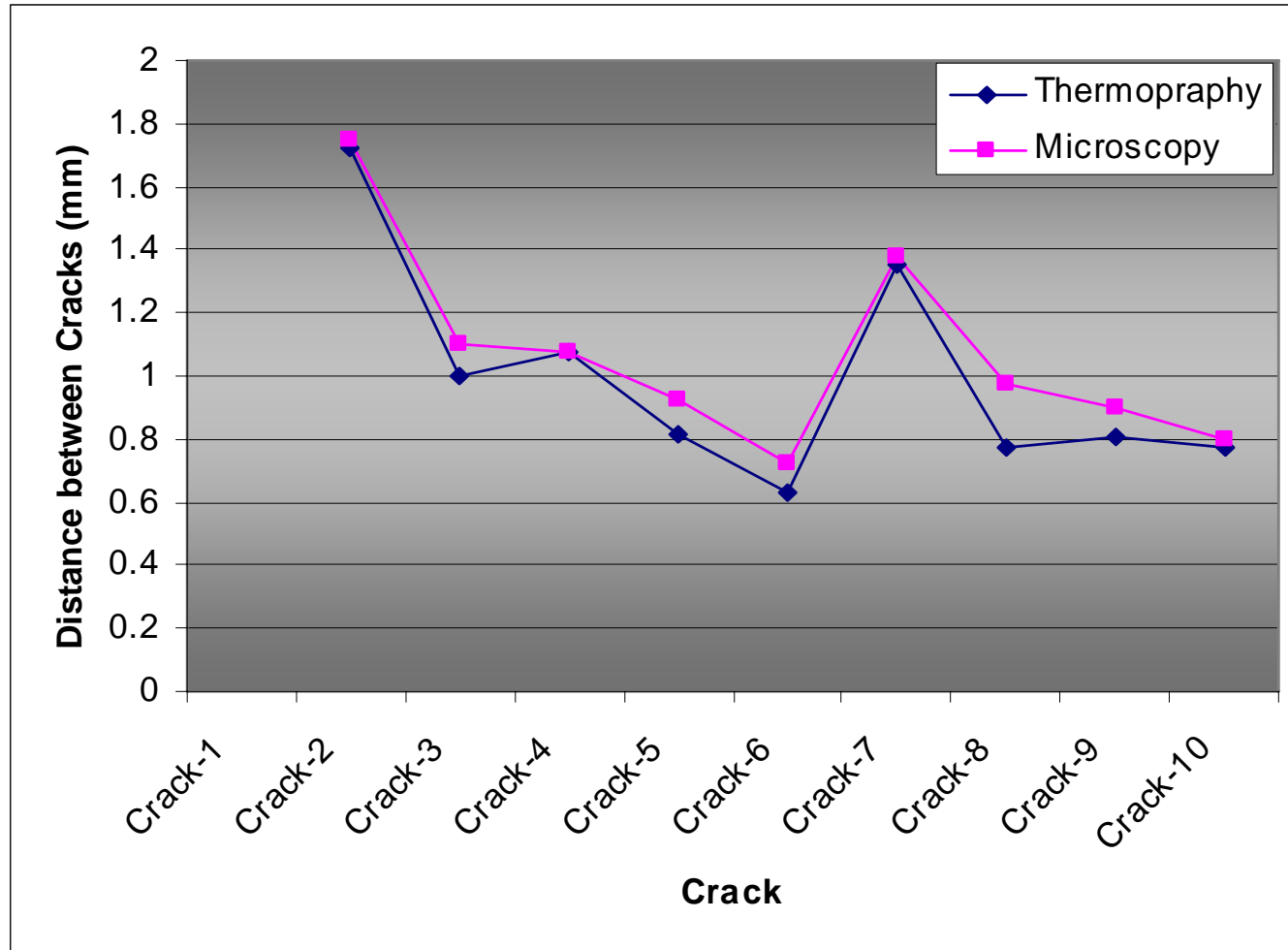
Large Surfaces Inspection



MI-CNRC 15.0kV 14.4mm x1.00

k YAGBSE 50.0um

Validation of Crack Position by Microscopy



Summary

- Advantages:
 - Heat is converted by the inhomogeneities
 - Detection of closed cracks
 - Fast
 - Inspect through the coating thickness

- Disadvantages:
 - Material dependant
 - Need contact to energize
 - Sensitive to Energizing Frequency

Future Work

- Detection of delamination
- Inspection of real parts (Funding?)