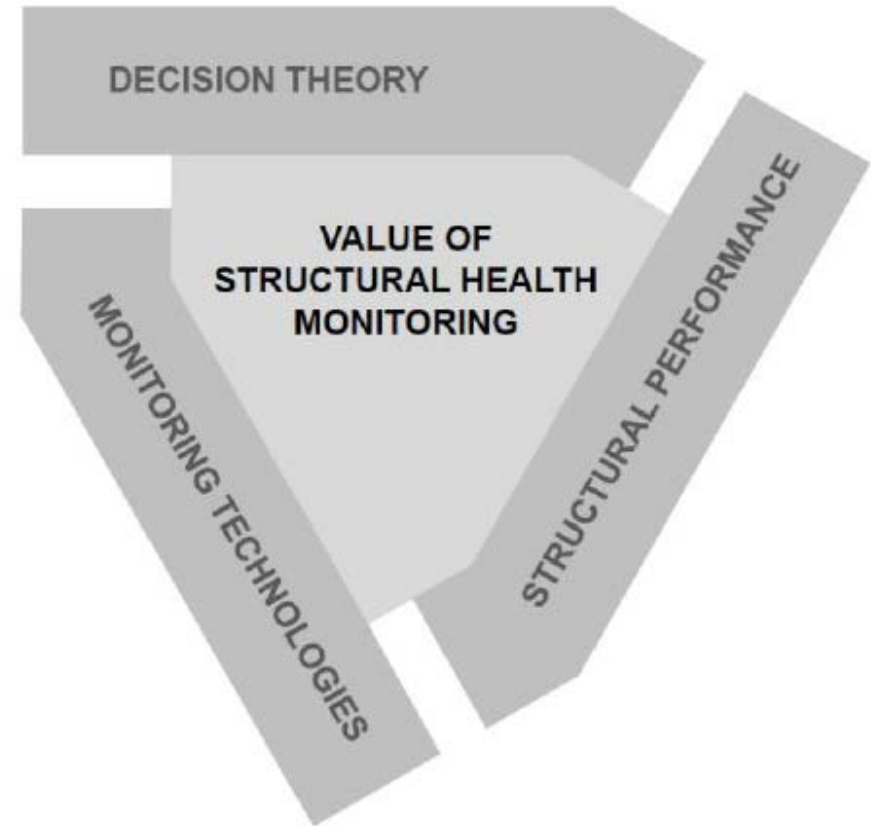


COST Action TU1402

Quantifying the value of Structural Health Monitoring

2nd Workshop
September 28-29, 2015
Istanbul



Discussion on
WG2: SHM Strategies and Structural Performance
WG3: Methods and Tools

Marios Chryssanthopoulos, Geert Lombaert, Michael Doehler
Daniel Straub, Eleni Chatzi

...from observations to decisions...

Structural Types

- Bridges
- Buildings
- Chimneys / Cooling Towers
- Dams (earth structures)
- Offshore Structures
- Nuclear structures

System

Performance

- Serviceability
- Ultimate/Limit State
- Fatigue
- Reliability
- Resilience
- Sustainability

Performance

Indicators

- Modal Frequencies/ Shapes
- Interstorey Drifts
- Stress ranges
- Crack widths
- Ductility
- Model Prediction Errors
-

Observations

- Deflections
- Vibrations
- Chlorides
- Acoustic Signals
- Operational Loads
- Extreme Loads
- Strains
- Environmental Variations
- Cracks

SHM

Technology

- FO sensors
- MEMs
- Laser
- GPR
- AE sensors
- Ultrasonic
- ...

Methods&Tools

Methods&Tools

Methods&Tools

Decisions

- Safety
- Functionality
- Life Extension
- ...

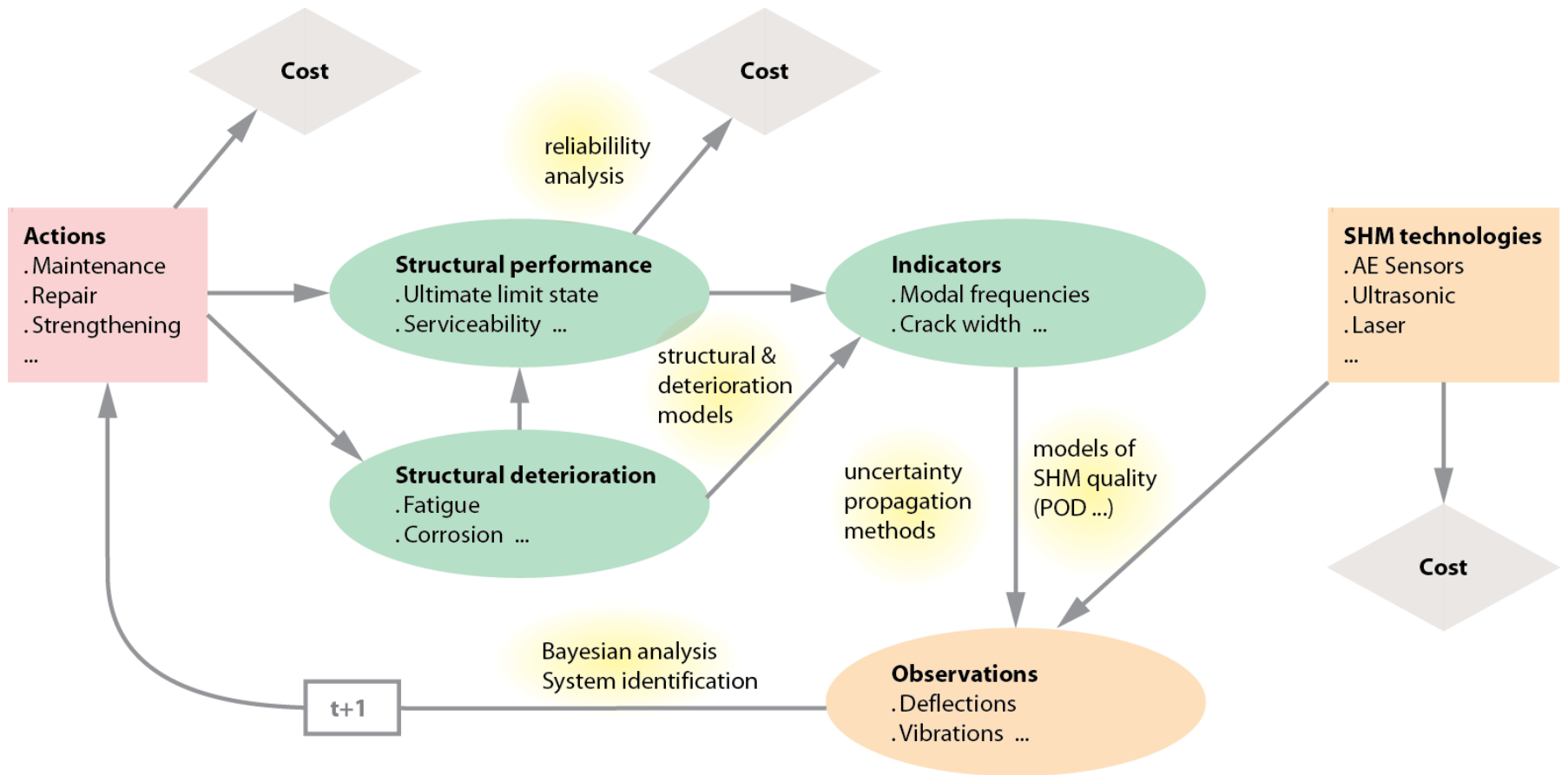
Actions

- Maintenance
- Inspection
- Repair
- Strengthening
-

Methods&Tools

Life Cycle Assessment

Influence diagram of the SHM process



WG2 and 3 parallel session

- Full list of SHM technologies in framework?
- Decisions and actions. Clarify flow? (Structural type > decision scope).
- Include benefits in influence diagram.
- Value for money instead of reduced costs (maximizing overall benefit).
- Structural performance includes changing operational conditions.
- Include “demand”/”capacity” in influence diagram (“demand” > “performance”).
- Include “dynamic response” as an indicator or include online or automated decision making in “Actions” (long/offline versus short term/online decisions making).
- Consequences need to include
- Sample structures versus population.

WG2 and 3 parallel session

- Include “importance” under decisions and actions.
- Include system performance indicator.
- Apply framework and influence diagram to test cases (more easily understood by nonexperts). Update bottom-up approach.
- Distinguish between short term and long term.
- Make Vol explicit in influence diagram.
- LCC.
- Remove loads from observations?
- Distinguish between observations/indicators of structural behavior and loads/actions.
- Include threshold (depends on importance of structure) in influence diagram.
- Include risk in life cycle assessment (trade-off risk versus costs).

WG2 and 3 parallel session

- Define optimization in influence diagram.
- SHM also provides information (loads, system response) which can be used in future designs of similar structures (sample <> population).
- Outcome of the action: standardization and specifications.

Fact sheets

- Shared structure. Two or three templates to structure contributions. Draft template made in WG1 (6 pages).
- Jana Markova: assessment of cooling towers and chimneys (masonry and concrete).
- Luis Oliveira Santos, colleagues (dams).
- Ian Smith (model falsification, model classes)?
- Michael Dohler, Geert Lombaert, Eleni Chatzi (Z24).
- Bernt Johan Leira (marine structures, ships, long term/short term observations).
- WG2 influence diagram.
- WG3 framework.
- Maria Limongelli + representatives of WG1, WG2, WG3 (glossary based on IRIS, check for specific terms in framework,).
- Gian Paolo Cimellaro (indicators for resilience, performance).
- Piotr Omenzetter, Maria Limongelli, Ufuk Yazgan, Serdar Soyoz (seismic response of buildings).
- Isaac (condition monitoring for specific decision scope).
- Ana Mandic, Helder Sousa (performance indicators for bridges, input from TU1406).
- Cesare Rizzo (marine structures).
- Helmut Wenzel (ranking of objectives from clients).
- Helmut Wenzel (existing guidelines).
- Ales Znidaric (WIM, traffic load monitoring).
- Michael Dohler, Maria Limongelli, Geert Lombaert (damage detection, vibration-based damage indicators).