WORLD FEDERATION OF ENGINEERING ORGANIZATIONS

WFEO Side Event

"Model Code of Practice for Climate Change"

Bonn I/II

16:45 to 18:15 pm

Tuesday May 24, 2016

Engineers, Infrastructure and Climate Change (Changing Climate)

- Professional engineers hold paramount the **health, safety and welfare of the public** with due regard for the environment

- Engineers must consider economic, **social** and environmental factors to achieve sustainable infrastructure

- Changing climate and extreme weather **threatens** our infrastructure – **now and in the future**

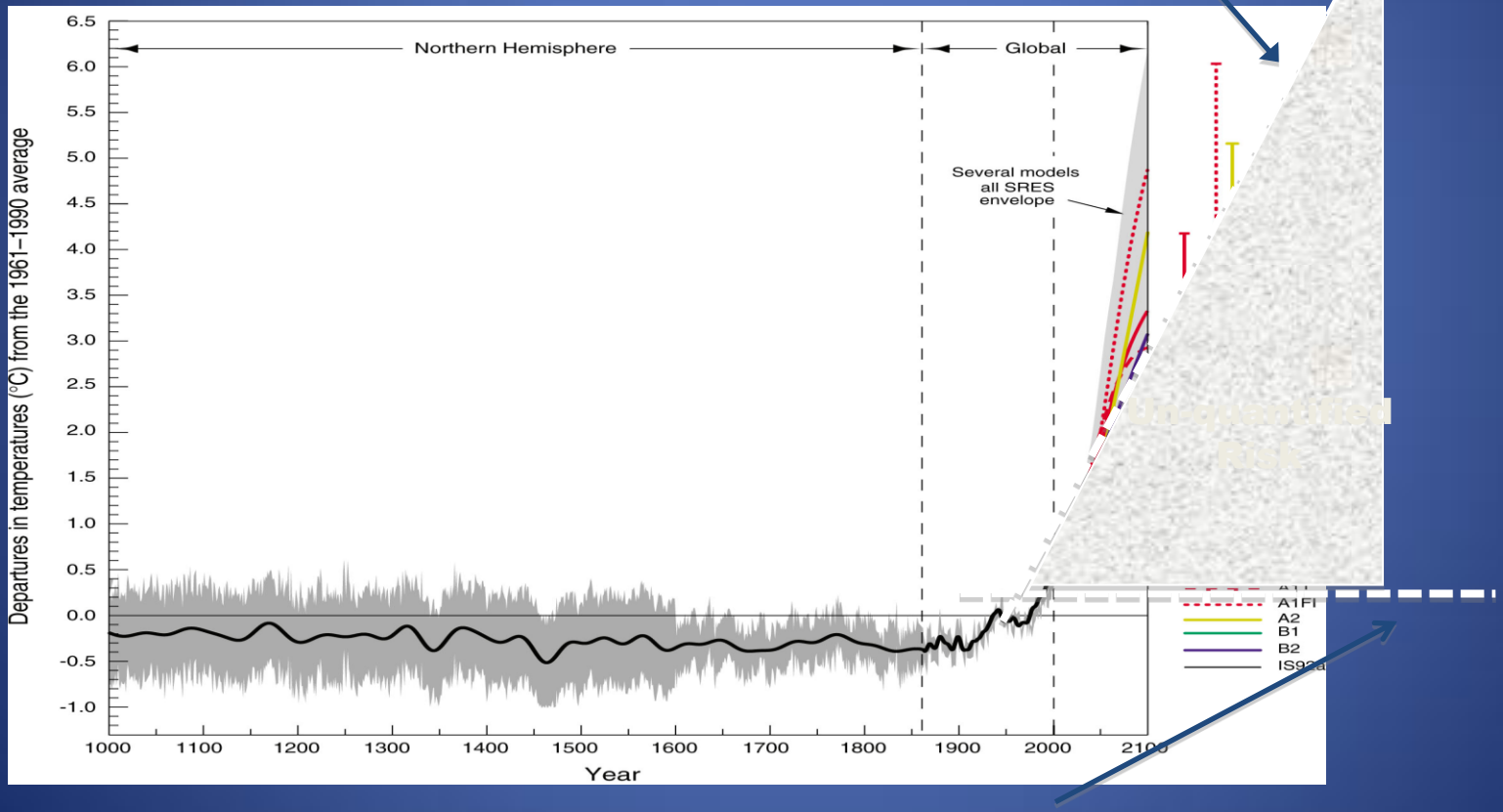
So what is the concern with infrastructure and changing climate?

- Increasing occurrence of extreme weather events causing damage and destruction with high cost to repair and replace
- Existing infrastructure has normally been designed using historical climate data
- Infrastructure will not be sufficiently resilient for its service life in the future climate

engineerscanada ingénieurscanada

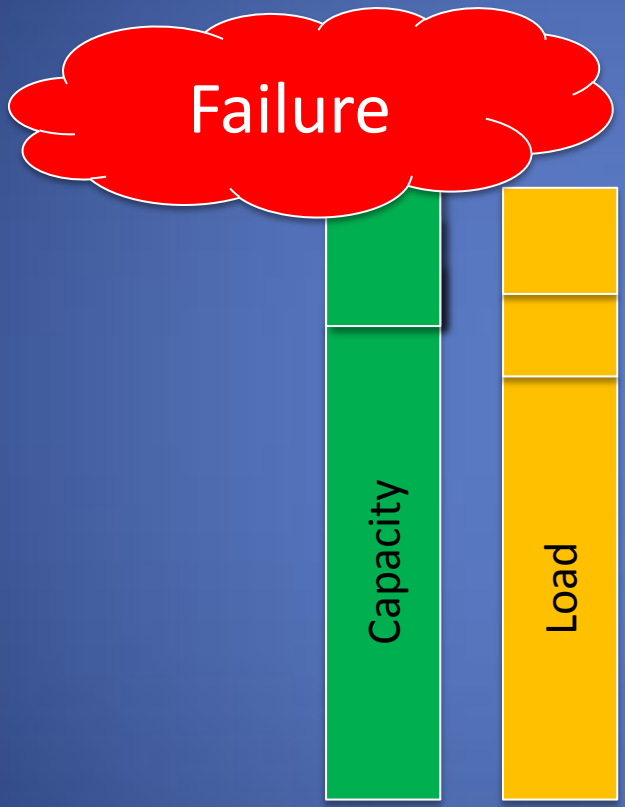
The Past IS NOT the Future

Current Trend



The Past is the Future

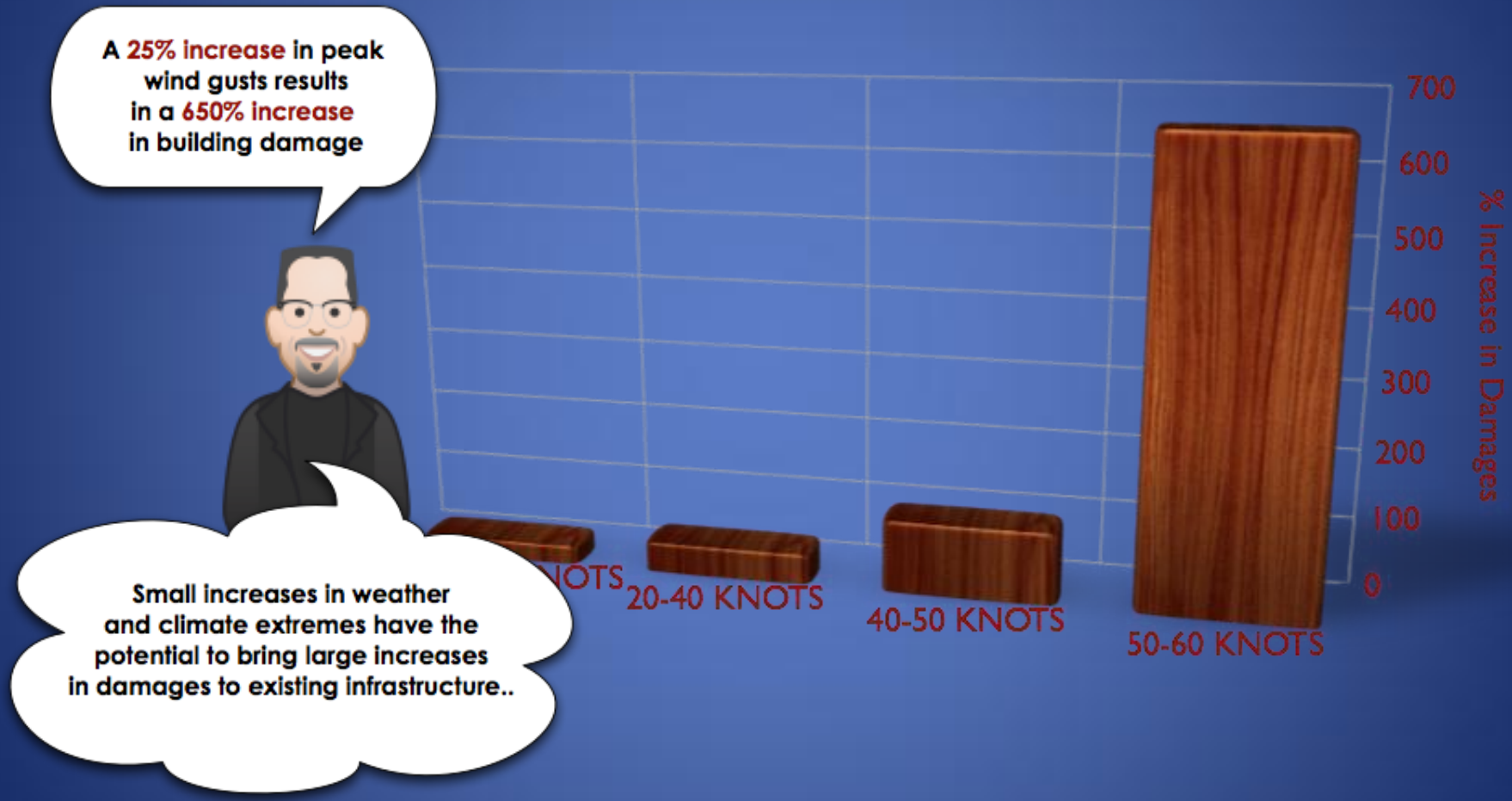
How do Small Changes Lead to Catastrophic Failure?



- Design Capacity
- Safety Factor
- Impact of age on structure
- Impact of unforeseen weathering

- Design Load
- Change of use over time
  - e.g. population growth
- Severe climate event

Small Increases Lead to Escalating Infrastructure Damage



Risks to Various Infrastructure Types from Increasing Climate/Weather Extremes (Frequencies/Intensities)

STRUCTURES	Ice Storms and Wet Snow	Rainfall Intensity & Accum.	Extreme Winds	Summer Storms & Tornadoes	Extreme Snow
Power Lines & Transmission Structures	FAILURE ice + wind	ADDITIVE	FAILURE	FAILURE	SOME
Communication	FAILURE ice + wind	ADDITIVE	FAILURE	FAILURE	SOME
Buildings	SEVERE ICING & WET SNOW	DRAINAGE & FAILURE	FAILURE	FAILURE	FAILURE
Roads, Bridges	OPERATION RISKS	DRAINAGE & EROSION	OPERATION & RISKS	FAILURE RISK	OPERATION
Stormwater & Wastewater	POWER FAILURES	TOTAL FAILURE	POWER FAILURES	FAILURE	RISKS
Water Supply & Distribution	POWER FAILURES	LACK OF - DROUGHT	POWER FAILURE	POWER FAILURE	RISKS

Why Address Infrastructure Risks?

- Minimize service disruptions
- Protect people, property and the environment
- Optimize service
  - Manage lifecycle
  - Manage operations
  - Avoid surprises
  - Reduce costs
- First step in planning adaptation

What is a “Model Code of Practice”?

Adoption as WFEO policy

Adoption by WFEO members (national engineering organizations) may be done in one of three ways:

1. Adopt as policy
2. Adopt as a requirement for individual engineers
3. Use as a source document to develop your own country-specific guidance

Scope

- Principles and framework to guide engineering practice in climate change adaptation to serve the public interest
- What to consider/do and less on the "how"
- Active language
- Technical details and methods on how to implement are largely left to the engineer and reflect the individual circumstances of the project or tasks he/she is undertaking

WFEO Goals
For Producing Codes of Practice

- To provide objective guidance to individual engineers on responsible engineering practice
- To provide a policy and implementing document to WFEO and its membership to use within their own organizations and countries
- To inform United Nations organizations and International Financial Institutions of the role, responsibility and practices of engineers
- To increase the profile and authority of WFEO in these subject areas

Code of Practice for Climate Change Purpose

- To inform, provide guidance, and encourage engineers to be **pro-active in managing the impacts of a changing climate on engineered systems.**

- Provides a basis for understanding and accepting definitions for key terms and concepts applied in assessing climate-induced risks.

Code of Practice for Climate Change Objective

- The overall intent of this code is to **ensure that engineers consider the implications of climate change in their professional practice and that they create a clear record of the outcomes of those considerations.**

The Nine Principles – Elements of Professional Practice (1)

Category #1 - Professional Judgment

- ✓ Principle # 1: Integrate Adaption into Practice
- ✓ Principle # 2: Review Adequacy of Current Standards
- ✓ Principle # 3: Exercise Professional Judgement

The Nine Principles – Elements of Professional Practice (2)

Category #2 - Integrating Climate Information

- ✓ Principle # 4: Interpret Climate Information
- ✓ Principle # 5: Work with Specialists and Stakeholders
- ✓ Principle # 6: Use Effective Language

The Nine Principles – Elements of Professional Practice (3)

Category #3 - Practice Guidance

- ✓ Principle # 7: Plan for Service Life
- ✓ Principle # 8: Use Risk Assessment for Uncertainty
- ✓ Principle # 9: Monitor Legal Liabilities

Guideline Principle # 1:

Integrate Adaptation into Practice

Implementing Actions, examples

- Listing the climate change predictions and potential impacts for the area where your project is located;
- Discussing the aspects of the project the engineer believes could be impacted;
- Detailing what has been done in the design to mitigate those impacts; and
- Detailing what additional/revised O&M and inspection procedures are recommended within the design-life of your project.

- Maintain a record of actions undertaken within daily practice that facilitate addressing climate change issues
- As appropriate, pursue education and training on climate change and meteorology to provide a scientific grounding on the subject matter that form a basis for climate change adaptation actions
- If an engineer is responsible for specifying engineering work, the specification should explicitly include consideration of climate
    - Consider the long term sustainability of the infrastructure
    - In procurement, allow margins to accommodate climate adaptation measures
    - In management, be receptive to recommendations that address climate risk
- Review operations, maintenance and management procedures and practices to accommodate future climate risks

- Consider using approaches that balance economic, environment and social considerations in recommending and implementing adaptation measures.
- Explicitly identify the requirement for identifying climate adaptation measures in contracted engineering work and reward proposals that include such recommendations.
- In defining environmental impact assessment terms and conditions, include climate change implications of the proposed project.

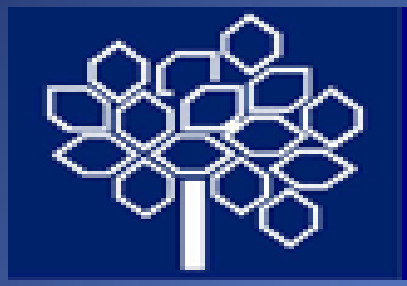
Communication and Outreach for WFEO Codes of Practice

1. Publish on the WFEO website (wfeo.org)
2. Presentations – on-site and on-line through webinars
3. Promotion and awareness through national members of WFEO
4. “Train the presenter” webinars
5. Training and education – workshops
6. Promotion to governments at all levels plus United Nations
7. Promotion to individual engineers through national members (websites, local outreach etc.)
8. Professional development events
9. Presentation to industry and practitioner NGOs

•

So . . .

Adoption of "Climate change adaptation principles"
offers engineers working with others to duly consider climate change in their professional practice to achieve technically feasible, cost-effective sustainable solutions.



WORLD FEDERATION OF ENGINEERING ORGANIZATIONS

Thank you!

david.lapp@engineerscanada.ca

www.wfeo.org