



19th International Conference on Structural Mechanics in Reactor Technology
Toronto, August 12-17, 2007



WM : Panel Discussion on Performance-Based Approach to Seismic Design

E. Viallet

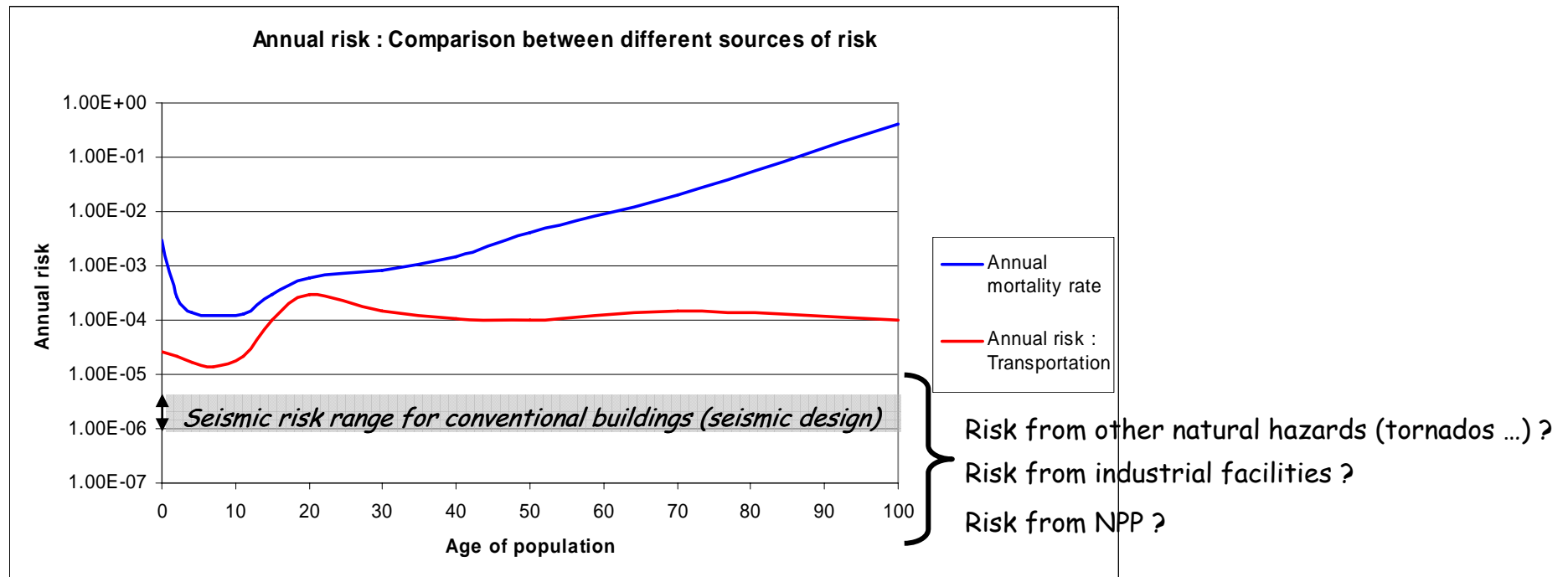
**Performance-Based and Risk-Informed Approaches :
Which level of risk is understandable and acceptable ?**



The level of risk understandable

❖ Which level of risk understandable ?

- By an engineer
- By public
 - ✓ Does 10^{-6} mean something ?





The level of risk acceptable

❖ Which level of risk acceptable ?

➤ How to express the risk for decision makers

- ✓ Individual risk : Risk for human being

xx / year : Risk of death for an individual

> ***Equal individual risk means equal protection of individual (citizens)***

- ✓ Risk for society : Risk for human being / surface of territory

yy / year : Risk of death for a community

> ***Including density of population***

$$\text{Risk for society} = \int_S \text{Individual risk (human being)} \cdot \text{Population density} \cdot dS$$

> ***An equivalent risk for society implies a non equal protection for individual (citizens)***

- ✓ Industrial risk

Depending on density of facilities

> Nuclear + other industrial facilities



Open questions for discussion

❖ **In terms of public acceptance and decision making**

- **How to make seismic risk understandable**
 - ✓ Compare to other risks
 - Transportation ?
 - Other natural risks ?
- **How to define an acceptable level of risk**
 - ✓ Risk for human being (individual citizen) ?
 - ✓ Risk for society (community) ?
- **How to insure that the risk is properly estimated ?**
 - ✓ Compare to historical risk ?
- **Which level for NPP (and other industrial facilities)**
 - ✓ Compared to other risk ?
 - ✓ Depending of number of facilities ?

↪ ***Can performance based design address these questions ?***