



**How can Bienz, Kummer & Partner Ltd.
Help you to Enhance Explosives Safety?**

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- **MSc. Eng. (Civil engineering) of Federal Institute of Technology Zürich (ETH), 1970**
- **Co-founder and Co-owner, CEO and Chief Safety Expert of Bienz, Kummer & Partner (BK&P), since 1991**
- **> 35 years of experience in the area of risk-based system safety assessment (RBSSA)**

Bienz, Kummer & Partner Ltd.

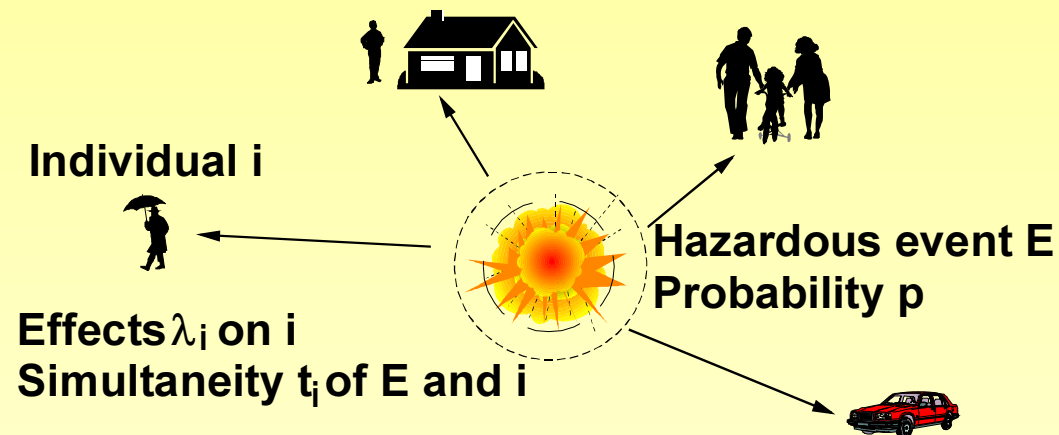
Ch-8125 Zollikerberg, Switzerland

Consulting Engineers for Safety Planning and Risk Management

- **Technical hazards, mainly dangerous goods (A+E)**
- **Risk-Based System Safety Assessment Concept (RBSSAC)**
- **RBSSAC:**
 - . **Methodology; models and data for probabilities and explosion effects (a.o. EXADAT[©]), planning and evaluation of tests; safety criteria**
 - . **Applications, (mainly in ammo and explosives handling): risk assessments, conceptual planning of safety systems and structures**
 - . **Design of protective structures**
 - . **Directives/regulations; training**

Quantification of Hazard

Risk = Probability x Consequences



Individual risk:

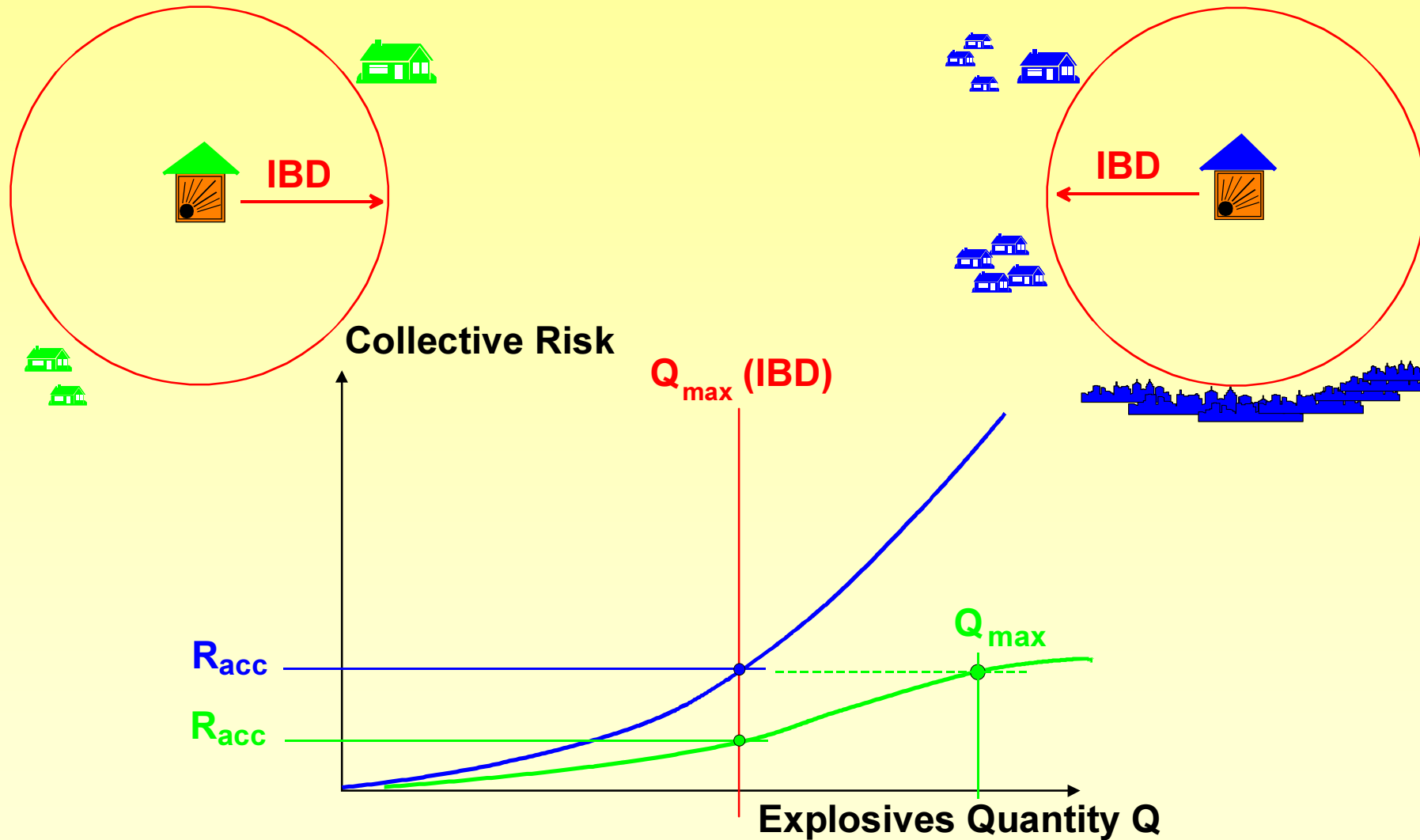
$$r_i = p \cdot \lambda_i \cdot t_i$$

Collective risk:

$$R_r = p \cdot \sum_i t_i \cdot \lambda_i = p \cdot C$$

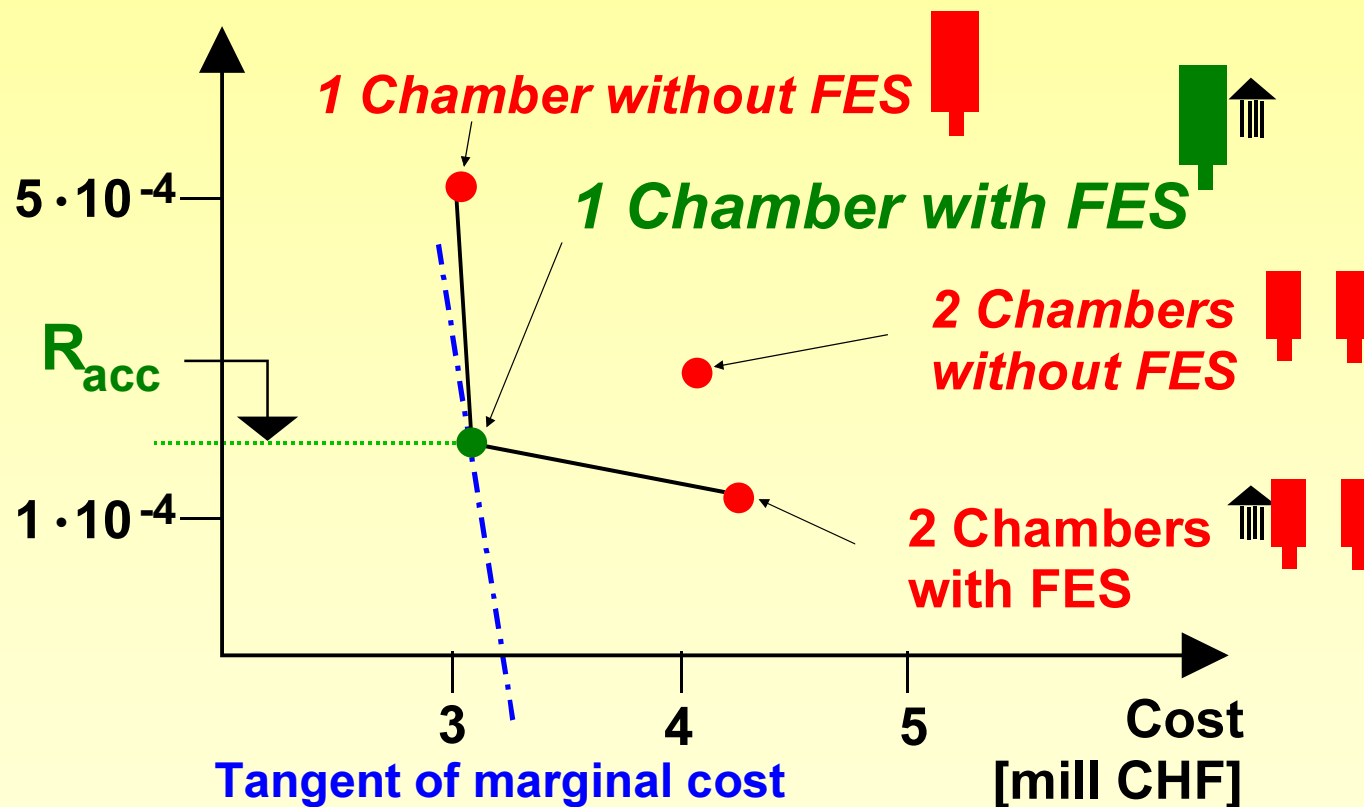
(C = Consequences)

Potential of Risk-Based Concept

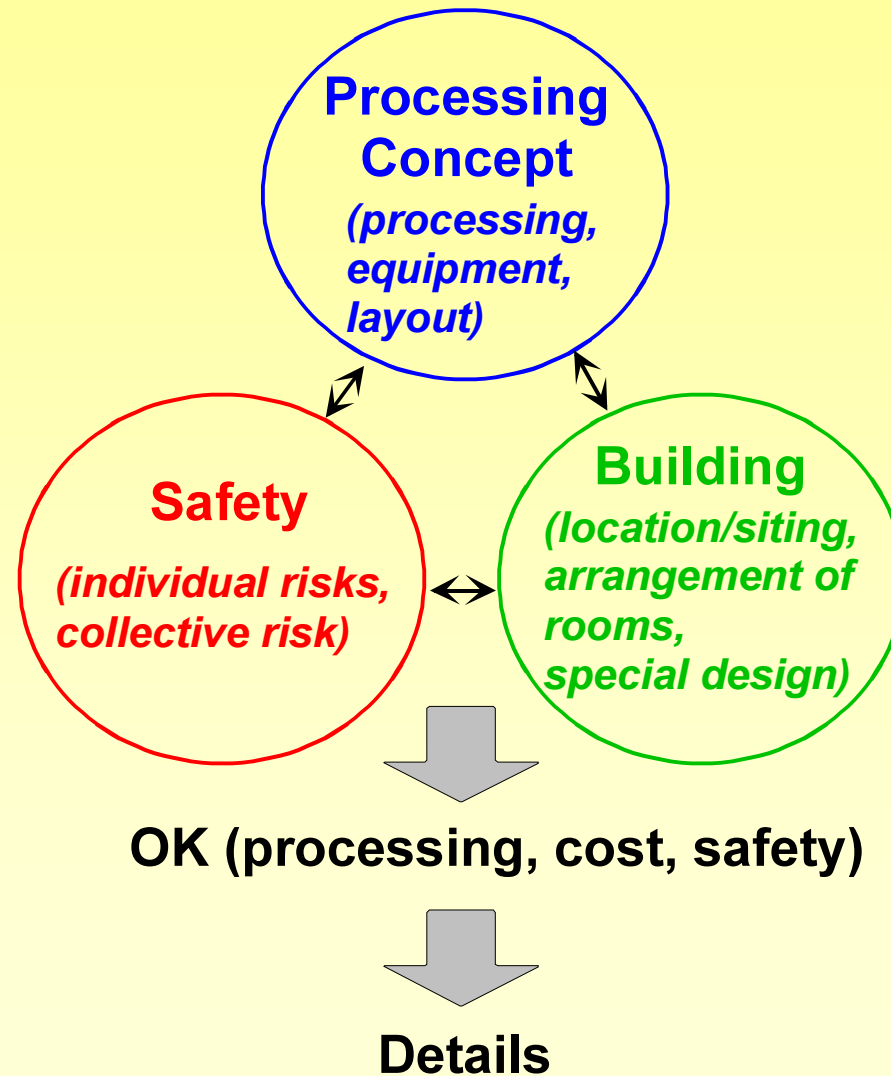


Example: Magazine(s) for Ammo Factory

Collective risk [victims (THP) /year]



Safety as an Element of the Planning Cycle



That's it!

Thank you!