INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES TOULOUSE

PTP « Risk Engineering »

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http://www.safety-engineering.org/

Université de Toulouse

Importance & Objectives

- **Engineering is faced with 2 goals**
  - To take risks
    - for innovation: new technologies (ex. Molecule, composite, nano), new products (ex. Aircraft), new processes (ex. chemical)
    - for life quality improvement (ex. food & water quality)
    - for new jobs
  - To enhance & to guarantee the safety

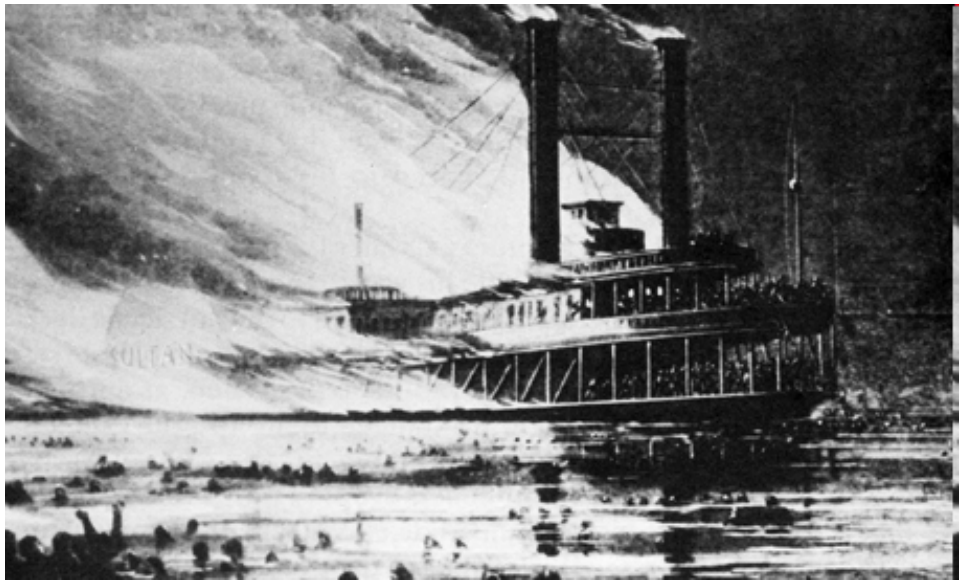
    (more requirements & regulations, evidence, etc.)

- **To reconcile these objectives, risks have to be controlled**
  - Using sound engineering approaches and
  - Competent professionals

Importance & Objectives

- **"Sorcerer's apprentice" is no more acceptable**

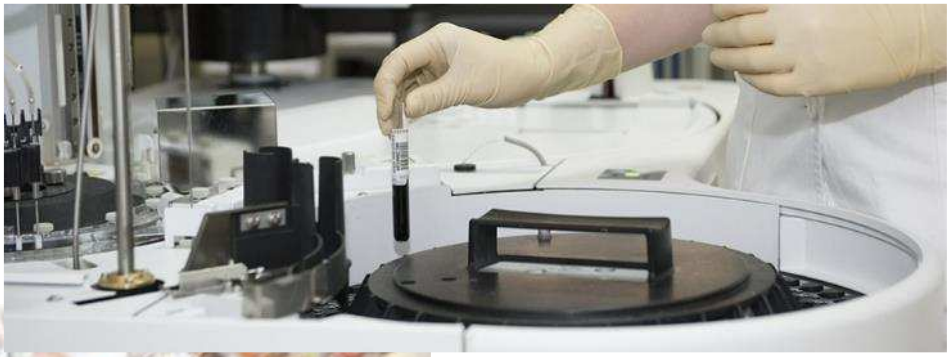
Innovation cannot justify accidents as "cost of progress"



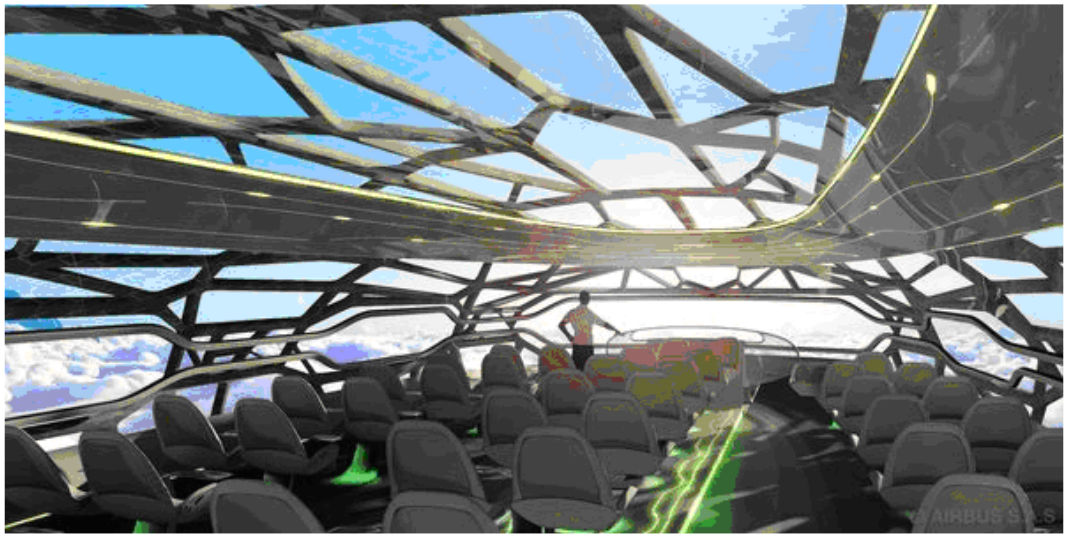
Importance & Objectives

- **A societal issue**

  www.gouvernement.fr/risques



Importance & Objectives



Airbus
&
Hyperloop

Curriculum

From handcrafts to engineers:

- **Knowledge exists (Safety Science) => Risk Engineering**

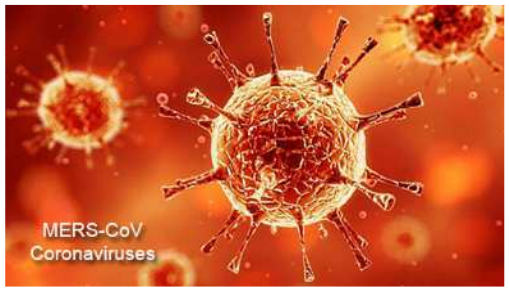
1. Generic knowledge as it concerns all domains:

- **Qualitative approach**

  One module = 3 weeks

- **Quantitative approach**

- **Managerial approach (*)**



Curriculum

2. Applied to specific sources

- Toxic risk on humans and environment
- Designing for safety
- Process safety
- Structural safety (*)
- Functional safety (*)
- Human and organizational factors (*)

Lectures by academics & practitioners (60%)

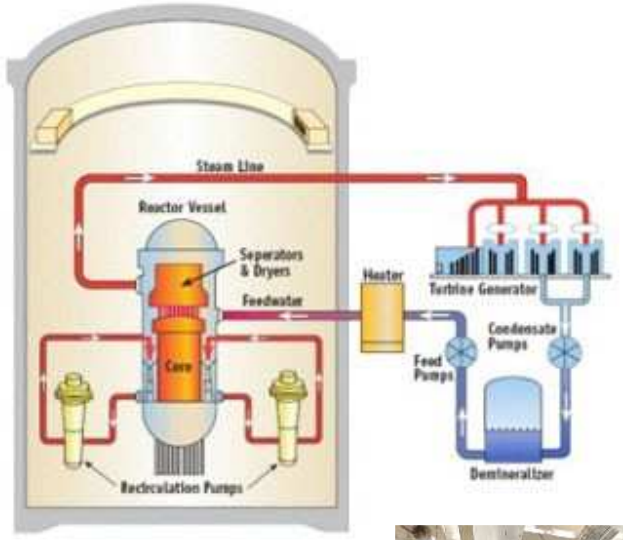
Case studies & projects

Online resources: https://seamonline.insa-toulouse.fr/

Curriculum

Both systemic & applied knowledge are necessary

- Process engineering
- Civil engineering
- Mechanical engineering
- Computer engineering
- Toxic impacts:
  - Environment
  - Humans



Control of each risk is required (part 2)
… but is not enough

Control of overall risk is required
(part 1: systemic approach)

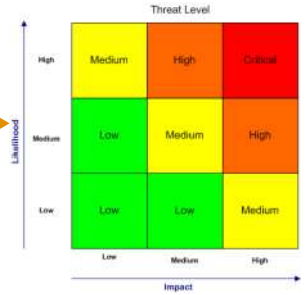
Curriculum

Features:

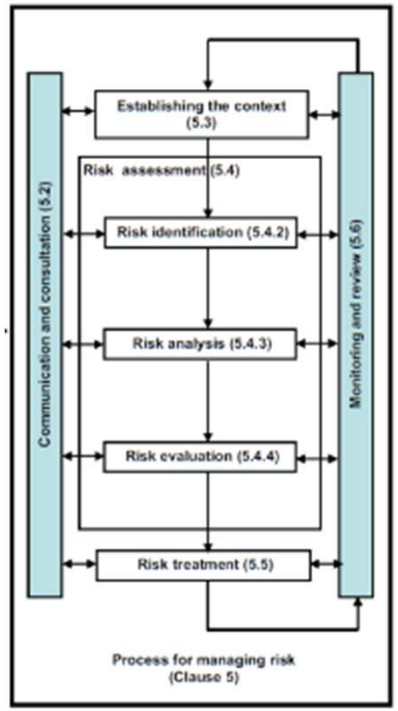
- ❖ <u>Technologies</u>: φ hazards
  Ex. Chemical product toxicity

- ❖ <u>Models</u>: Abstract concepts
  Ex. Risk, Safety, Acceptability

- ❖ <u>Methods</u>: Activities
  Ex. Risk analysis



- ❖ <u>Processes</u>: Management
  Ex. Risk Management Process & System



Curriculum

Safety: A transverse domain

- Useful to handle actual problems
- Adapted to students
- Preserving your initial specialty
  (initial knowledge & diploma)
- Opening your mind … it works (15-year experience)
- Find out more? SEAM SAFETY ENGINEERING AND MANAGEMENT

International context

- **Students from 5 continents:**
  - **Africa**: Algeria, Cameroun, Congo, Egypt, Ghana, Ivory Coast, Morocco, Mozambique, Nigeria, Ruanda, Senegal, Tunisia, Uganda
  - **Americas**: Argentina, Bolivia, Brazil, Columbia, Mexico, Santo Domingo, Venezuela
  - **Asia**: Bahrain, China, Korea, India, Indonesia, Iran, Japan, Kazakhstan, Lebanon, Malaysia, Pakistan, Syria, Thailand, Vietnam
  - **Europe**: Finland, France, Germany, Greece, Macedonia, Netherland, Norway, Portugal, Spain, UK
  - **Oceania**: Australia, New-Caledonia

Carrier opportunities

Types of activities:

- **Business units** taking safety regulations into account
- **Safety departments** specifying best practices and auditing
- **Specialized consulting and auditing firms**
- **Public agencies** specifying the requirements and assessing the effectiveness of risk control (certification): ASN nuclear, ANSM medicine, EFSA food, ERA railways…

Carrier opportunities

- **Multidisciplinary subjects**
- **At the interface of various stakeholders**
  - Decision-makers (top management, authorities, …)
  - Engineers
  - Interested parties (users, neighbors, ...)
- **In offices or in the fields**

Guarantees

- **Students from all INSA degrees**
  - 2009-2010 (2): Clémentine (GBA) - Fares (Informatique)
  - 2010-2011 (4): Aziz (RT) - Isadora (GPE) - Marie (GBA) - Mathieu (GM)
  - 2011-2012 (5): Fabien (GM) - Rémi (GSI) - Romain (GM) - Rui (GM) - Sébastien: (GSI)
  - 2012-2013 (5): Cynda (IR) - Cyrielle (GBio) - Emilie (GBio) - Lucie (GBio) - Virginie (GM)
  - 2013-2014 (4): Marie (GPh) - Mathilde (GPE) - Blandine (GPE) - Morgane (GBio)
  - 2014-2015 (3): Claire (GPh) - Robin (GPE) - Julian (GPE) + 1 TBS
  - 2015-2016 (8): Damien (GPh) - Alexandre (GPh) - Sarah (GM) - Jérôme (GM) – Anaïs (GEI) - Sarah (GPE) - Karen (GPE), Antoine (Gbio) + 2 TBS
  - 2016-2017 (7): Alienor (GPE) - Daeim (GPE) - Aurane (GPh) - Alice (GPh) – Thibault (GM) - Melanie (GC) - Bastien (GMM)
  - 2017-2018 (5): Julien (GPh) - Jules (GEI) - Pauline (GM) - Morgan (GM) - Nesrine (GPE)
  - 2018-2019 (6): Angélica (GM) – Charles (GB) – Charlotte (GC) – Kris (GM) – Michel (AE) – Mohd (IR)
  - 2019-2020 (5): Simon & shihong (GB) – Pierre (GM) – Flora & Avotra (GP)
  - 2020-2021 (5): Mathilde (GP), Pauline (GPE), Louis (GC), Lucile & Hugo (GM)
- **Preserving your initial specialty (risk mitigation)**

INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES TOULOUSE

Guarantees

Recent but renowned

(December 2012)

Mastères coaccrédités										
INSA TOULOUSE-INP Risk engineering	★★	2007	50	15	40%	6	8100	Ingénieurs	100% à la sortie	32000

Une fois le diplôme en poche, ces cursus courts permettent de se démarquer et de viser plus haut.

POS'

Douze exemples de mastères spécialisés	Cote du diplôme	Année de création	Nombre de candidats	Nombre de places	Taux d'enseignants cadres d'entreprises	Durée minimale du stage (en mois)	Coût de la scolarité (en euros)	Profil des admis	Rapidité d'insertion	Salaire annuel brut moyen des diplômés (en euros)
Ecoles de management										
[illegible]									[illegible]% à 6 mois	36000 à 40000
[illegible]									[illegible]% à 3 mois	46000
[illegible] International finance	★★★	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] à 24600	[illegible] masters	100% à la sortie	51365
TÉLÉCOM EM Ingénierie des affaires internationales	★★★	2006	30	15	67%	6	7500	Ingénieurs, masters, bac +4	90% à la sortie	40000
Ecoles d'ingénieurs										
BORDEAUX SCIENCES AGRO Gestionnaire du domaine viticole	★★	1989	35	20	50%	6	7900	Œnologues, BTS agricoles avec expérience	100% à 3 mois	22000
CENTRALE PARIS Technologie et management	★★★	1988	110	30	62%	4	14900	Ecoles de commerce, masters gestion, économie, IEP	100% à 6 mois	41000
ENAC Aviation safety aircraft airworthiness	★★★	1993	20	25	40%	4	12000	Ingénieurs, masters scientifiques	100% à 3 mois	38000
[illegible]NSAE PARISTECH [illegible]délisation économique [illegible]tatistique	★★★	1988	79	25	30%	4	5000	Masters, ingénieurs, écoles de commerce	100% à 2 mois	40900
MIN[illegible] DOUAI Systè[illegible] de mesures et métro[illegible]e	★★	1999	12	20	50%	4	4000	Ingénieurs, masters	NC	NC
POLYTECH [illegible]LLE Génie de l'ea[illegible]	★★	1996	40	14	96%	6	3893	Ingénieurs, masters	50% à la sortie	29250 à 31000
Mastères coaccrédités										
INSA TOULOUSE-INP Risk engineering	★★	2007	50	15	40%	6	8100	Ingénieurs	100% à la sortie	32000
INSA LYON-ENSATT Direction technique du spectacle vivant	★★	2001	15	10	50%	4	7350	Ingénieurs, masters	100% à 6 mois	24000

NC : non communiqué

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Université de Toulouse

Guarantees

Recent but renowned (March 2014)

Unique in Engineering!

6-year Accreditation / Advanced Master's degree SEAM

INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES TOULOUSE

Guarantees

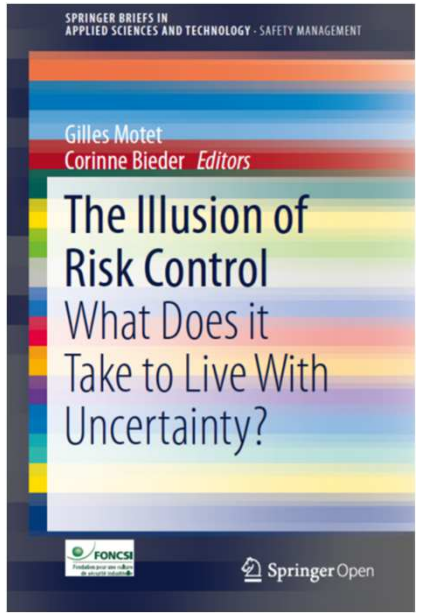
ICSI
Institut pour une culture de sécurité industrielle

Université de Toulouse

Guarantees

Experienced Manager

- **Representative of France at ISO TC 262 « Risk Management »**
- **Co-author of**
  - Guide 73 « Risk Management – Vocabulary » (2009 - 2018)
  - ISO 31000 « Risk Management – Principles and guidelines » (2009 - 2018)
  - ISO 31004 « RM – Guidance for implementation of ISO 31000 » (2013 - 2018)
- **Lectures:**
  - Europe-China Forum on Risk Management in Beijing (2014, 2015)
  - Univer. of Aeronautics and Astronautics Nanjing & Beijing (2011, 2013, 2014)
  - Geneva (Switzerland) and Wellington (New-Zeeland, 2012)
  - International Safety Forum (Saint-Petersburg, 2012)
  - Keio University, Tokyo (Japan 2008, 2011)
  - Politecnico di Milano (2008, 2009)
- **Scientific Director of ICSI & FonCSI (2005 – 2015)**
- **Member of ICSI Board since 2015**



Find out more…

- http://www.safety-engineering.org/
- https://seamonline.insa-toulouse.fr/

- English: https://www.youtube.com/watch?v=hjakmTC9NZQ
- Francais: https://www.youtube.com/watch?v=HFe_emCZZkg
- Espanol: https://www.youtube.com/watch?v=_Mwk33QOmPQ
- Arabic: https://www.youtube.com/watch?v=okbqu6QgNEk

- https://www.youtube.com/watch?time_continue=5&v=6i_ATvK5HW4

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