

# Sociological Issues in Fire Safety Regulation

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Integrating Technical and Social Aspects of  
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# Sociological research issues



# Regulation

- Long history of mitigation of harm from technology
- Fire, pollution, health & safety
- Ban wooden buildings, limit effluent from paper mills, stop/control use of harmful chemicals in industry

# Regulatory Challenges: The Collingridge Dilemma

- Full impacts only evident when technology is mature and in use
- But mature technology entrenched and hard to control or change
- => 'Precautionary Principle' – burden of proof to show lack of harm if plausible serious risk
  - e.g. EU policy on Genetically Modified Organisms

# Regulatory Challenges:

## Regulatory Capture

- Regulation compromised because industry can form powerful interest groups whereas public concern is diffuse (and, some suggest, because regulators tempted by corporate job offers)
- Sometimes regulatory agency has joint (conflicting) role of promotion (e.g. Federal Aviation Administration, UK Atomic Energy Authority)
- Deregulation agenda of recent decades undermines capabilities of regulators, leaving vacuum for industry to fill
  - e.g. Steel industry and Eurocodes development
  - ‘Responsible person’ legislation and fire risk assessments

# Regulatory Challenges: Expertise Asymmetry

- Science and technology best understood by 'core set' of practitioners
- Regulators cannot have same level of expertise without unrealistic funding
- So regulators dependent on data, analysis and advice provided by those with vested interests (e.g. drug company trials)

# Regulatory Approaches: Outcomes

- e.g. end of pipe effluent
- Measure harmful consequences and then make perpetrator stop or pay fines
- Limited expertise required, industrial process can be seen as 'black box'
- Too reactive for fire safety (or airliner reliability)

# Regulatory Approaches: Prescription

- Codification of crude functional requirements
- Needs functional equivalence metrics for performance (e.g. fire resistance)
- Regulatory expertise: how to follow 'the letter of the law'



# Regulatory Approaches: Performance

- Regulatory expertise: how to follow ‘the spirit of the law’, e.g. to provide ‘adequate’ or ‘satisfactory’ fire safety outcomes
  - But how are these quantified or judged?
  - Is it appropriate or feasible to use ‘equivalence’ to the presumed function of prescriptive regulations?
  - Do regulators have sufficient expertise to judge fire safety solutions based on first principles knowledge claims, and to interrogate underlying assumptions of models and critique spurious precision?
- Risk that expertise asymmetry produces outcomes that are too conservative or too permissive?

# Delegated Regulation: Pharmaceuticals

- Approval decisions (especially in difficult cases) often rely on expert opinion
- But ‘independent’ experts (usually university scientists) typically hold grants (and sometimes shares) from ‘big pharma’
- Also organisational filtering of test data (e.g. unwanted results can be withheld)

# Delegated Regulation: Aviation

- Complexity of airliner technology means Federal Aviation Administration chose long ago to rely on company employees as Designated Engineering Representatives

*high-technology regulators contend with an intractable technical problem by turning it into a more tractable social problem ... despite appearances to the contrary, the FAA quietly assess the people who build aeroplanes in lieu of assessing actual aeroplanes (Downer 2010, 84)*

- Safety maintained due to reputational threat to Boeing and Airbus, and incremental nature of airliner innovation

# Regulation of People

- Professional Accreditation
  - e.g. Doctors, Lawyers, Structural Engineers
  - Structural Engineers ‘rubber stamp’ designs, have contractual and criminal liability, gain accreditation through education and experience
  - e.g. 2003 Building (Scotland) Act:  
*experienced, competent and responsible professionals can certify compliance with the Building Regulations without any further check by local authorities, provided that they are employed by reputable companies operating proper checking procedures*

# Fire Safety Engineering as a Profession?

- But fire safety engineering is new profession, heterogeneous in education and experience
  - Fire safety processes less well understood, less testable, and more probabilistic in nature than structural safety
  - Poor fire safety designs can lay dormant for many years
  - Perhaps personal liability less likely to be enforced given potential passing of time, diverse knowledge claims involved, and difficulty of data collection

# Conclusion

- Fire safety science and engineering have come a long way in forty years
- But greater knowledge does not necessarily mean safer buildings!
- Regulation is changing, but move to PBD raises serious questions about ...
  - The competency of regulators to adjudicate on basis of complex knowledge claims
  - The maturity of fire safety engineering as a profession suitable to increasingly self-regulate itself