AWARENESS AND PREPAREDNESS for EMERGENCIES AT LOCAL LEVEL

Sweden, October 2004
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APELL - Sweden, October 2004
disasters affect everyone
Part I -
what do we know about disasters?

• Was the risk understood?
• Who was responsible for the disaster?
• What did the public know, understand?
• Was there an emergency plan?
• Was the response adequate?
• What would have prevented the accident, or mitigated the consequences?
some notable recent disasters

- Toulouse, France - factory explosion
- Baia Mare, Romania - mining accident
- Enschede, the Netherlands - fireworks
- Lagos, Nigeria - pipeline fire
- Bangkok, Thailand - transport spill
- Patayas, Philippines - landfill collapse
- Izmit, Turkey - refinery destruction
- Mt Blanc, France - tunnel fire
- Iran, Korea - train explosions
- E. Europe - flooding
- Peru - glacier collapse
- Canberra, Australia - forest fires

what lessons can we learn?
the Toulouse accident

21 September 2001

31 people died                  >3,000 people injured
the Baia Mare accident

30 January 2000

70 tonnes of cyanide released into the Danube
the Nigeria pipeline accident

17 October 1998
650 people died
Lagos munitions explosion
27 January 2002

>2,000 died  >2,000 injured
Enschede fireworks depot

13 May 2000

20 people died                     1,000 injured
Payatas dumpsite collapse

11 July 2000  200 people died
Bhopal pesticide plant
3000+ deaths
the Mt. Blanc tunnel accident

24 March 1999       39 people died
the Izmit earthquake
17 August 1999

> 14,000 people died

> 27,000 people injured
the Acrylonitrile transport accident - Bangkok

September 2001
Firestorm - Canberra

Jan 2004  - 4 deaths; part of city burnt out
Melting glacier - Peru
Yungai - 25 000 killed (1970)
Train explosion - Iran
300+ deaths
Oil spill - the Prestige
13 November 2002
Mining - tailings dam, Spain
environmental damage, 3 deaths during clean-up
Flooding - Eastern Europe
2002

© http://photogallery.czweb.org
Flooding and chemical plants
Flooding - Bangladesh
Some common elements

- It was not expected that such a disaster would occur. Preparedness was at a low level.
- Rescue services were not so well co-ordinated
- These disasters could have been prevented, or their damages lessened
- People were living too close to risk areas
Some conclusions

- disasters affect all countries
- there are consequences for personal, social, environmental, economic fabric
- natural and technological disasters often combine
- human development often occurs in hazardous areas
- society is more sensitised to rescue needs than prevention
Environmental impacts of disasters

- health risks and disease
- water and air pollution
- chemical risks to people and biota
- waste disposal problems (debris)
- land degradation
Offsite impacts of industrial accidents

Industrial accidents affect the public as well as workers

• toxic gas
• water pollution
• physical harm
• fires/explosions
• crushing during mass panic
• hazards during clean-up
Some lessons from disasters

- Halifax, 1917 - if there is risk of explosion, don’t look out the window
- Bhopal, 1986 - if there is a gas cloud, stay inside
- Izmit, 1999 - in case of earthquake, stay outside
- Nigeria, 1998 - for transport accidents, don’t stay to watch
- Austria, 2000 - for tunnel fires, move against the wind
- Canberra, 2004 - for forest fires, protect windows and roof gutters

But how do people learn these things ???
Emergency management considers interventions on:

- risk sources
- emergency plan
- public knowledge
- liability
- adequate response
Part II - preparing for emergencies

- hazard/risk identification
- prevention of hazards
- early warning
- preparedness
- emergency response
- rehabilitation
- improve strategic safety
Key factors for emergencies

- people know how to react correctly
- emergency services are co-ordinated
- emergency infrastructure is available
Try prevention first

- intrinsic safety
- add-on safety
- safe habits
- safety culture

whose responsibility?
How to inform people of hazards and responses

• inform “if x, then y”
• wait for instructions - Rotterdam
• inform beforehand about hazards - Altona
• enable hazard assessments - TR12
• involve in emergency planning - Mumbai
• practice and drills - Sao Sebastiao
Industrial risk in Provence : 92 « Seveso » plants

It's an APELL problem!

RISQUE D'INCENDIE
Risques de brûlures et d'asphyxies.

RISQUE D'EMISSION DE GAZ TOXIQUES
Risques de nausées, d'intoxications.

EXPLOSION RISK
BURNING OR MISSILE PROJECTION

FIRE RISK
ASPHIXIA
BURNING

TOXIC CLOUD RISK
EMISSION NAUSEA/POISONING

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Local hazard identification
## Risk Assessment

<table>
<thead>
<tr>
<th>Object</th>
<th>Operation</th>
<th>Hazard (quantity)</th>
<th>Risk-type</th>
<th>Threatened object</th>
<th>Consequences</th>
<th>Seriousness</th>
<th>Probability</th>
<th>Priority</th>
<th>Comments</th>
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</thead>
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**Object**

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How to co-ordinate emergency services?

- simplify command structures
- establish coordination mechanisms (gov-gov; gov-ind; ind-ind)
- practice drills
- common equipment and procedures
- common information base and risk maps
- involve in hazard mapping and assessment
- involve in emergency planning
What emergency infrastructure?

- community alert; downstream alert
- combating the accident
- people rescue
- community information
- medical services
- environmental security
- clean-up
- lessons learnt assessment
- site assessment/risk assessment
Some common elements for all the partners

• hazard & risk assessments
• community information
• emergency planning
• practice and drills
Some outcomes

• absence of panic
• risk reduction initiatives
• greater trust in emergency procedures
• better planning

Overall -
lower risk, smaller consequences
Can we package all this into a single programme?
AWARENESS AND PREPAREDNESS FOR EMERGENCIES AT LOCAL LEVEL
The APELL Process
APELL as a process

- local level
- multi-stakeholder
- open communication
- joint objectives
APELL partners ensure the local application
Identify participants and their roles
Step 1

Evaluate and reduce risks offsite
Step 2

Review existing plans and identify weaknesses
Step 3

Task identification
Step 4

Match tasks and resources
Step 5

Integrate individual plan into overall plan and reach agreement
Step 6

Draft final plan and obtain endorsement
Step 7

Communication and training
Step 8

Testing, review and updating
Step 9

Community education
Step 10

THE 10 STEPS of the APELL-Process
APELL component - hazard assessment

Some example of how to generate risk information of interest to the community:

- hazard mapping based on land planning data
- hazard reporting - e.g. SEVESO
- hazard identification methodologies - industry - HAZOP, HAZAN
- hazard identification methodologies - community kit - TR12
- consequence analysis - CAMEO
A GIS on industrial risks
CAMEO -- Computer-Aided Management of Emergency Operations is a system of software applications used widely to plan for and respond to chemical emergencies. It is one of the tools developed by the Environmental Protection Agency’s Chemical Emergency Preparedness and Prevention Office and the National Oceanic and Atmospheric Administration to assist front-line chemical emergency planners and responders. CAMEO can be used to access, store, and evaluate information critical for developing emergency plans. The CAMEO system integrates a chemical database and a method to manage the data, an air dispersion model, and a mapping capability. All modules work interactively to share and display critical information in a timely fashion.
“Risk-speak” has to be adapted to the audience, and what they want to know:

- speaking to the experts - terminologies and concepts - e.g. ICOLD, OECD
- speaking to authorities e.g. when reviewing permits
- speaking to communities - SEVESO II, GRI
- briefing your own organisation e.g. your CEO
- speaking to other stakeholders e.g. ICPDR
- speaking to rescue services - signposting your hazards - e.g. UN Dangerous Goods labels, Hazmat
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UN Dangerous Goods label

1.1, 1.2 or 1.3
Class 1
Division 1, 2 or 3

Explosive
UN transport label

1.1, 1.2 or 1.3
Class 1
Division 1, 2 or 3
Explosive
APELL component - emergency communication

During an emergency you need to know some important facts quickly. These come from:

• alarm signals
• radio and TV
• fixed instructions e.g. fridge magnets
• what you see or smell

Instructions need to be simple and easily understood. This teaching has to take place before an emergency, just in case.
Si escucha la sirena comunitaria:

- Diríjase a un lugar cerrado.
- Cierre puertas, ventanas y persianas.
- Infórmese por Radio Nacional FM 99.3
- Respire a través de un paño mojado.

- No retirar a los chicos si están en la escuela.
- No encender ventilación ni calefacción.
- No usar el teléfono.
- No encender fuego, velas, faroles a gas, etc.
- No fumar.

El horario de prueba de la sirena comunitaria es:
los días jueves a las 11 hs.
Tenga a su alcance una linterna y una radio a pilas.
some French examples

recent changes in France require:

- hazardous installations to inform the community
- creation of a community committee (CLIC)
- schools to have emergency plans and trained teachers
To be effective, especially for a big community, emergency plans need to be practised regularly. Examples of community practice:

- Sao Sebatiao, Brazil
- Marseilles, France
- Ecopetrol, Colombia
- Bahia Blanca, Argentina
- Altona, Australia
- Pesticide company - Mumbai, India
MANUAL APELL
DE SÃO SEBASTIÃO

PLANO DE AÇÃO DE EMERGÊNCIA
PARA ACIDENTES TECNOLÓGICOS

São Sebastião
APELL applications

• chemical and other industries
• fuel storage
• mining
• transport
• natural disasters
• weather and health
APELL Worldwide - examples

- Bahia Blanca - Argentina
- NW Region Arctic
- Ecopetrol - Colombia
- Sao Sebastiao
- Thailand - IEAT
- Croatia
- Melbourne
- Italy - (Rio Tinto)
- Schkopau, Germany
- Bouches du Rhone, France (Cypres)
These are the APELL partners!

**STATE**
- Etablit les lois
- Délivre les autorisations
- Assure le contrôle

**DRIRE**
- Direction Régionale de l'industrie, de la Recherche et de l'Environnement.
- C'est l'administration française chargée d'inspecter les installations industrielles.

**PUBLIC**
- accès aux documents administratifs
- Est consulté lors de l'enquête publique
- Dispose de droits de recours

**LOCAL AUTHORITIES**
- Est consulté lors de toute procédure d'autorisation
- Définit les plans d'urbanisme

**INDUSTRY**
- Demande l'autorisation d'exploiter une usine
- Applique l'arrêté préfectoral
- Assure la prévention des risques

**LES SYNDICATS**
- Représentent le personnel dans l'entreprise

**YOU**

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APELL as a Programme
APELL as a local level process depends on a higher level framework of:

- national emergency strategy and administration
- ‘right to know’ legislation and transparency
- culture and practice of community involvement
- interagency cooperation
- assistance in hazard identification

- promotion of APELL process from higher up
UNEP’s role in APELL

- launched APELL in 1988, in Paris, global network
- promotes application in countries, local communities
- provides advice, methodologies, information
- collaboration with international industry
- support from governments - USA, Sweden, India, ..
- co-operation with international organizations - OECD, EC, ECE, OCHA, WHO, IOMC, IMO, etc.
UNEP role and activities

- APELL strategy and co-ordination
- catalytic role, not intervention
- information support - documents, internet
- initiates demonstration projects at local level
- assists in national training seminars/workshops
- supports creation of national APELL centres
- maintain a regional/international APELL network
- encourages application in new sectors
Applications

- Industrial accidents
- Transport (TransAPELL)
- APELL for Ports
- APELL for Mining
A number of influential partners have helped to create and maintain the international APELL programme:

- SRSA, EPA
- ICCA, ICCM
- corporations Dow, Shell, Bayer, Mobil
- OECD
- NAC Mumbai
Who else is supporting APELL?

Other international organisations are promoting or implementing some or all of the APELL components, although not always under this name:

• OECD - “Guiding principles …”
• EC - SEVESO II Directive
• ECE - Transboundary Accidents Convention
• IMO - APELL in ports
• ISDR, OCHA, WHO and other agencies support APELL concepts
APELL horizons

Beyond its origins in industrial applications, the APELL process is also relevant to

• transport of materials
• natural disasters
• climate change and other environmental impacts
• new health risks

In fact, any community risk for which good planning can mitigate risks and consequences.
natural and technological hazards remain everywhere. Major accidents are still occurring
many industrial accidents have a strong impact on public security/safety
public awareness of hazards would reduce risks to communities
emergency services need to be better prepared and co-ordinated
APELL is valid in all countries
APELL is local level process; UNEP can advise
APELL website

http://www.uneptie.org/pc/apell/home.html
Annex I

APELL in Mining
Mining as a hazardous industry

Historically:

- high workplace accident rate, esp. underground and artisanal mining
- much environmental damage
- community suffers, but has no voice
- transport risks often ignored
- orphan sites not taken into account
- rehabilitation risks not calculated
community impacts - some examples

• tailing spill - Stava (270), Meerespruit (16)
• cyanide spills - Baia Mare, Omai - environmental pollution
• collapse of site - Lessing
• ASM site collapse - Bolivia
• mercury transport - Yanacoocha (health impacts)
• clean-up accidents - Aznacollar (4)
• pipelines - frequent breaks - pollution

cf: underground mines - frequent, multiple deaths
Some mining accidents
Stava, Italy
Meeriespruit, S. Africa
22 February 1994
Meeriespruit, S. Africa
22 February 1994
Amatista, Nazca, Peru
Omai mine, Guyana

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situation analysis

• wide variety of risks, beyond experience of managers and rescue services
• remote locations, far from help
• companies not used to managing such risks systematically; no procedures
• weak or no legislation
• communities have no idea; unprepared
• crisis communication is a challenge for companies
• results encourage anti-mining sentiments
causal factor analysis led to:
• action on strengthening emergency regulation and enforcement
• improvements in design standards
• mine planning needs to improve - better risk evaluation in financing
• improved code on materials handling e.g. cyanide
• APELL for Mining guideline
What results to date?

The UNEP work has accelerated the following:

- ICMM has adopted APELL
- Companies using APELL to check their procedures, including transport
- Cyanide Code has been developed - companies signing up
- Application of APELL being tried in ASM in Bolivia
- Revision of EC legislation on mining
- Lessons learned and management guides by ICOLD
- Countries revising technical standards - Canada
Canada Guidelines

A Guide to the Management of Tailings Facilities

September 1998

The Mining Association of Canada
1105-350 Sparks Street
Ottawa, Ontario
Canada K1R 7S8
www.mining.ca
With a sustained push we can expect:

- companies will embrace APELL process; associations an APELL programme
- regulations to incorporate emergency preparedness and community aspects into law and its implementation
- professional bodies will incorporate public risk aspects in procedures and standards
Annex II

APELL in Transport
transport as a hazardous activity

Historically we know that transport risks are everywhere. Some examples are:

• maritime - Prestige (oil), Halifax (explosion)
• railway - chlorine leak (Canada), explosion (Iran, Korea)
• road - fuel (Iran), cyanide (Kyrgyzstan), acrylonitrile (Bkk), mercury (Peru)
• air freight - cyanide (PNG), collision (Amsterdam)
• pipelines - gas explosion (Siberia), gasoline (Nigeria)
some transport disasters
Prestige, Spain
Iran, rail explosion
the Acrylonitrile transport accident - Bangkok
the Nigeria pipeline accident
the Mt. Blanc tunnel accident

24 March 1999  39 people died
Some special factors

- Potentially affected community is very big
- Operator is not an expert in materials handling
- Rescue services are far away, not expert
- Consequences are difficult to calculate
- International dimension imposes constraints
Some risky cargoes

From a human and environmental point of view, the following should be carefully transported:

• chemicals
• metals, minerals
• fuels
• explosives
• radioactive sources
• biological materials
• wastes
2 examples to discuss:

- the spill of mercury at Yanacoocha by itself was not so immediately damaging. But the collection and domestic distillation by villagers unused to handling mercury caused serious health impacts.

- the collision of a local bus with a truck carrying cyanide resulted in a spill that caused much concern, and was not able to be dealt with by local emergency services (who in Peru are volunteers, not professionals).
Future challenge for transport emergencies

Construct a global programme for safety and emergency preparedness for transport of hazardous materials - TransAPELL
TransAPELL

Guidance for Dangerous Goods Transport Emergency Planning In a Local Community

UNEP United Nations Environment Programme

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UN transport label

1.1, 1.2 or 1.3
Class 1
Division 1, 2 or 3
Explosive
examples from Brazil

Example from both private and public sector:

• The chemical association ABIQUIM now requires all member companies use only accredited road contractors for off-site transport

• Contractors are reviewed through a questionnaire, and have their operations independently audited

• Under national regulation major roads must have specific emergency plan for transport of dangerous goods
Reducing underlying Risk Factors

“prevention is better than cure”

- reducing risks
- protecting people
Prevention options

Risk assessment is a basis for prevention planning -

• Lower risk activities - ISP, green chemistry
• Land planning - move people away from hazards
• Land use practices - forestry/deforestation
• Safety culture - in industry (DuPont, Antamina) to safer areas
Building on experience

Example of UNEP and Baia Mare. This led to:

• emergency guidelines (APELL for Mining)
• safer design
• improved regulation
• careful financing
• procedural guidelines (cyanide code)
Reducing the consequences

- managing environmental factors - firebreaks, dykes, setbacks, drainage systems
- human settlement and land occupancy
- habitat (building) protection in urban and industrial zones
- personal protection esp in industry
- early warning systems, hazard labelling
- strengthening first responders
- human understanding of hazards
Two cautionary examples

Without proper care, the ‘lessons learned’ will be quickly forgotten. The importance of institutional memory is under-rated.

• Design, operation of mobile pressure vessels
• Industrial gas compressors

• Source - Trevor Kletz
Part IV - Working Group Exercises

- priorities concerning disasters
- local emergency plan
- safety culture in a company
- public communication about hazards
- addressing transport risks
- safety culture
Exercise 1

Discuss relative importance of environmental, social and economic impacts of natural disasters and industrial accidents as seen by:

- media
- politicians
- experts
- citizens

How do the rescue services integrate these views into their planning?
Exercise 2

Avoiding an urban disaster

Study the background note concerning the problem of abandoned chlorine cylinders

• the situation around the warehouse
• the options to reduce the risk

1. Prepare an advisory note to the Office of Disaster Preparedness
2. Suggest the approach to public communication
3. Outline an emergency plan in this case
Exercise 3

A town of 50,000 inhabitants is near a major earthquake zone. The need for local fuel-wood has depleted the forest on the steep slopes overlooking the town. A refinery nearby receives natural gas by pipeline for its operation.

How do you inform the community of the risks of possible disasters, and how they should react in case of a disaster event?
Exercise 4

Transport risks - how to reduce in your country?

A new industrial operation is being planned in a remote area to boost regional development. It will require the road transport of sulphuric acid, hydrogen peroxide and cyanide from the rail terminal, crossing the main city, and then through a number of small hill-side towns and villages along the way. The company manager comes to see the Director of the transport ministry to ask what safety measures should be taken.

Identify and discuss the issues on both sides, and prepare a public document and press statement with the outcomes.
Exercise 5

Risk prevention - Design a programme to improve the safety culture in a mining company located in your country:

• item 1
• item 2
• item 3
• item 4
• item 5
• item 6