Presentation of progress of work in the "Accident Analysis" working group

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Summary

The "Accident Analysis" - AA - working group, initiated in January 1993, was at the origin of an investigation through a questionnaire on strengths and weaknesses of current accident databases. The results of this investigation were presented at the Autumn 1994 ESReDA Seminar on Accident Analysis.

A second step of the AA work began in December 1994 and had an objective to prepare a Directory of databases on accidents in industry and transport of dangerous goods.

An inquiry was launched in Western Europe on the basis of a database description form. The information collected was analysed and assembled at Disaster Prevention and Limitation Unit, University of Bradford. The harmonized form of each database dealt with identification, technical aspects, access condition and use, and database details. Comments will be given on databases involved and main peculiarities.

This Directory should later be disseminated largely to promote the harmonization of databases and to facilitate networking between developers, operators and end users.

One hopes that enough ressources will allow to regularly update this Directory.

I. INTRODUCTION

A first step of Accident Analysis (AA) working group ended last Autumn 1994 at the ESReDA Autumn Seminar on Accident Analysis, by presenting a report on the Initial Assessment of Strengths and Weaknesses of Current Accident Databases.

This report was part of an on-going collaborative exercise and dealt with an overall "broad brush" assessment of the status and perception of current accident databases in Europe, as seen by users.

For this exercise, a questionnaire was distributed by AA group members in 13 different countries. 93 questionnaires, valid for analysis, were returned and analysed at DPLU which issued the report.

From this investigation, about 85, either dedicated in house or generic, databases were identified.

As a conclusion of this report, it was emphasized in a recommendation :

"Consideration be given to the future convergence of current accident databases and the development of a future European or international network accident database. Immediate consideration be given to producing an ESReDA Directory of Accident Databases".

The ESReDA Executive Committee accepted and supported by funding the preparation of the above mentioned Directory which later will be described in details.

For defining the goals of this Directory, a AA meeting was held in December 1994 and defined a database description form.

We will first explain briefly the purposes of such a Directory. Then, some comments and main peculiarities on databases involved will be given.

As a conclusion, the needs for efficient networking of database operators will be emphasized.

II. DEFINITION OF A DATABASE DESCRIPTION FORM, INQUIRY AND PURPOSES OF A DIRECTORY THEREOF

In the database description form (Annex 1) four sections were identified : identification, technical aspects, access conditions and use, and database details.

The inquiry phase was launched in 1995 and the form addressed to the previously known database operators. An extension of contacts with other database managers was carried out.

Answers were received for 47 database operators. Very surprisingly, only 13 previously identified databases are included in this Directory.

In order to promote as many answers as possible, an announcement of this work has been done to different technical journals, mainly in France, Norway and United Kingdom.

The goal of such a Directory as a tool for engineering companies, competent authorities, consultants, universities, research organisations, insurers, would be to get information on accidents in various industries and transportation systems. It is to be considered as a first step for getting a future convergence of current accident databases, each database becoming part of a larger network in the future. Every operator has to be an expert of the area in which he is collecting data for insuring a high level of data dependability : further a specification of minimal requirements has to be drawn in considering mainly data input.

With such a goal, it must be realized that the end-users of the data may have various objectives :

. identify accident scenarios

. identify deficiencies of potentially hazardous plants, buildings and transportation systems (in design and operation)

. help to identify whether current emergency procedures are appropriate

. assist national and international competent authorities, financial and insurance companies to formulate proactive policies

. assist consultants in their tasks dealing with safety cases and experts in accident investigations

. develop quality aspects for data and software

. improve total quality management of safety and training of operators and managers

. collect reliability data and failure rates

. look at compliance with regulations, codes of practice and standards

. develop research project for understanding involved hazardous phenomena, hazardous situations and initiating events

. encourage the incorporation and use of databases in the curricula of universities and other academic courses

. improve the right to know attitude of large public.

III. COMMENTS ON THE ACCIDENT DATABASES DIRECTORY

These comments will be given successively for the four sections : identification, technical, access and use, database details. They are very broad comments to be revised when the work on the Directory is finished and then given as an introduction of the Directory.

III.1. Section 1 : Identification

A classification scheme can induce a single answer on the following items : Government/Authority (26), Industry (8), Insurance (1), Consultant (5), University (1), International Organization (3). Between brackets, after each class, the number of collected forms is given. It must be pointed out the vast majority of answers from "Government/Authority" class. As a consequence, the regulations and their violations are certainly more dealt with in this type of database.

The fact that e.mail was only mentioned by four organizations is to be considered later if more efficient networking of databases is to be seeked for.

30 of the 47 databases are operated in UK, 4 in France and 5 in Norway and 4 international organizations. The other involved countries are Canada, Finland, Romania, Sweden, Holland.

The working language is predominantly English.

The search and analysis capabilities is mentioned by a "yes" in 27 answers, the operating systems being predominantly distributed mainly between Windows (50 %) and DOS/OS2/UNIX ($\approx$ 25 %).

III.2. Section 2 : Technical

As regards the data storage, only one answer reported a totally paper based database. Three additional answers mentioned part use of a paper support (generally for old data).

Apparently, 20 different database programs are used and only 3 are mentioned 5 times : Dbase, Oracle and Dataease. Such a remark may be considered at a later stage of networking as a rather important difficulty preventing the rapid exchange of information between databases operators.

The data could be retrieved under searchable fields, texts and records with 2 exceptions for which only free texts were searchable.

III.3. Section 3 : Access and use

Among the 47 databases collected, only 8 are available without restriction. Although, about half the 39 others can be bought by the end-users, in some instances under CD-ROM versions.

Regarding the intended use (multiple answers possible), as mentioned by the operators, the number of quotations are :

4 for multipurpose
29 for Government/Authority
21 for industry
10 for insurance
15 for consultants
11 for university
12 for research organization
8 for international organization
4 for general public
1 for training.

As mentioned above, the Government/Authority databases collected are 26. If they can be used predominantly to check the policy against accidents, it does not mean that they are exclusively dealing with such an aspect : only 7 are 100 % dedicated to the Government/Authorities purposes.

However, the interest from other parties is very large and would imply for the future a better definition of final goals when learning from experience is to be considered.

When looking at the type of access and at the availibility of the database to be bought, as a whole or in part, 16 operators give this possibility to customers. A significant number of database being on CD-ROM and regularly updated. The selling price could be in the order of magnitude from 3 000 to 12 000 US dollars. When the database is accessible on line (10 cases), the access fee for one research, between 50 and 300 US dollars, is strongly dependent upon the extent of the research.

In many occasions, a documentation (multiple answers possible) is available to users :

. user's manuals for 22 databases
. thesaurus or code manual for 9 databases.

Regarding the source information (e.g. accident reports) their availability to users is mentioned for 20 cases. Such an attitude must be looked at in details because dependable data need the checking of the source information in many instances.

III.4. Section 4 : Database details

The following types of data (multiple answers possible) can be found in the databases (with number of quotations) :

coded data : 31
free text searchable : 28
free text non-searchable : 6
keyword : 29
numeric : 29

The industrial areas and activities (multiple answers possible) are the following (with numbers of quotations) :

offshore : 12
nuclear : 4
refining : 16
chemical : 18
transport : 31
pesticides agriculture : 1
water pollution : 5
explosives : 2
fires : 3
mines : 1.

The 40 databases for which the number of records are reported include 488 753 reports, with a minimum number of 150 and a maximum of 79 000.

From the 39 databases giving the time period covered, 6 were initiated before 1969, 14 in the seventies, 10 in the eighties and 9 in the nineties.

The criteria for including accidents and incidents are given thereafter with the number of quotations (multiple answers possible) :

all below mentioned criteria used : 4
chemicals involved : 21
type of hazardous events : 30
near miss : 7
number of fatalities : 14
number of injuries : 9
material losses : 8
environmental losses : 11
according to gravity scale : 7.

Among the other criteria for inclusion, fires were mentioned four times. The other following criteria were only reported once : helicopter accident, chemical poisoning, accidents sent by authorities, railway accidents, offshore oil gas drilling mining units, complaints from inhabitants and "required by law to report accidents or failures".

IV. CONCLUSION

One of the most interesting conclusion drawn from the forms is the very large number of accident reports mentioned in each database (about 12 000). Certainly, it implies a lot of redundancies as regards the criteria chemicals. An important task should be for example the avoidance of multiple entry of the same incident or accident in various databases. At last Autumn ESReDA seminar, it was proved that the input of the same accident in various databases lead to uncertainties in the data included and induce loss of confidence from the users. Such a drawback should only be avoided by networking of databases dealing with the same field.

Generally speaking, the dependability of data must be improved by using a process in which both the chemicals and process or systems involved should be checked. Regarding the effects of accidents, a gravity classification is only reported in very few cases. Efforts should be devoted to develop a well accepted incident report form using some types of gravity (and probability) scale.

The working group "Accident Analysis" could direct its efforts into these objectives for which harmonization of methodology of data collection, analysis and checking, networking and standardization of tools are important. At a European Union level, a project could be developed between interested database operators. This Directory should be considered as a first step to improve the dissemination of dependable data to potential end-users.

Accidents in Industry and Transport of dangerous Goods

A. IDENTIFICATION

1. Database

1.1 Acronym/common short name   : ....

1.2 Full name   : ....

2. Operator

2.1 Organization name   : ....

2.2 Owner's organization/company name
    (if different from 2.1)   : ....

2.3 Contact person   : ....

2.4 Contact person's address   : ....

    : ....

    : ....

2.5 Contact person's telephone no.   : ....

2.6 Contact person's telefax no.   : ....

2.7 Contact person's e-mail no.   : ....

(continued...)

2.8 Organization/company classification   :

☐ Government/Authority   ☐ University

☐ Industry   ☐ Research organization
   Area: ....
                                          ☐ International organization (e.g. OECD, UN,...)

☐ Insurance
   Area: .... ☐ Other, specify: ....

☐ Consultant
   Area: ....

B. TECHNICAL

1. Database storage:

   ☐ Paper-based (non-electronic) only

   ☐ Electronic

2. Database
   (e.g. Access, dBase, FoxPro,....) : ....

3. Working language
   (e.g. French, English,...)   : ....

4. Retrieval of data:

   ☐ Searchable fields, text, and records

   ☐ Searchable free text only

   ☐ Non-searchable free text only

5. Does the database, as supplied to users, provide search and
   analysis capabilities (e.g. statistical analysis, cross analysis,...)?

   ☐ Yes   ☐ No

   If Yes, does it run under: **If No**, what software is needed?:

   ☐ Windows   ....

   ☐ DOS/OS-2/UNIX,....

   (please tick all boxes that apply)

C. ACCESS AND USE

1. Status of database:

   ☐ In operation, regularly updated

   ☐ In operation, no longer updated

   ☐ Under development, available (date): ....

2. Availability:

   ☐ Restricted to own organization

   ☐ Open (no restrictions)

   ☐ Restricted, specify: ....

   ....

   ....

3. Main existing/intended users of database:

Percentage:

☐ Government/Authority   ....

☐ Industry. Area   : ....

☐ Insurance. Area   : ....

☐ Consultant. Area   : ....

☐ University   ....

☐ Research organization   ....

☐ International organization (e.g. OECD, UN,...)   ....

☐ Other, specify: ....

(please tick all boxes that apply)

4. Type of access:

☐ Database may be bought (whole or in part)

Format:
    ☐ Diskettes

    ☐ CD-ROM

    ☐ Tape

    ☐ Hard copy paper

    ☐ Hard copy microfilm

(continued...)

☐ User specified output (e.g. data compilations, statistical analyses,....). Specify:

....

....

....

Format:
    ☐ Hardcopy

    ☐ Diskettes

    ☐ Other, specify: ....

☐ Online access, direct from operator

☐ Online access, via host (e.g. DIALOG, QUESTEL,..)

    Specify: ....

☐ Other, specify: ....

....

....

(please tick all boxes that apply)

5. Cost of access (US Dollars); <u>if free of charge, please state</u>

    Database purchase/subscription   :   ....

    Typical data search   :   ....

    Online access   :   ....

(continued...)

Published reports (e.g. periodic
statistical reports)   :   ....

Other, specify (type, cost)   :   ....

....

6. Demonstration version available?:

☐ Yes. Medium: ....

☐ No

7. Available user documentation:

☐ User's manual   Language (e.g. French, English,...): ....

☐ Thesaurus or Code manual
    (with code explanations)   Language (e.g. French, English,...): ....

☐ Other. Specify: ....

Language (e.g. French, English,...): ....

(please tick all boxes that apply)

8. Source information (e.g. accident reports) available for users?

☐ Yes

☐ No

D. DATABASE DETAILS

1. Type of data:

☐ Coded data (e.g. CAS number, code for installation type,...)

☐ Free text, searchable

☐ Free text, non-searchable

☐ Keyword, descriptor or controlled text fields

☐ Numerical values (e.g. quantities, no. of fatalities, financial losses,.....)

(please tick all boxes that apply)

2. Industrial area(s) and activities covered:

☐ Offshore

☐ Nuclear

☐ Refining

☐ Chemical

☐ Transport, marine/shipping

☐ Transport, land

☐ Other, specify: ....

(please tick all boxes that apply)

3. Time period covered   : ....

(continued...)

4. Geographical area(s) covered : ....

    ....

5. Number of accident/incident records : ....

6. Approx. number of accident/incident
    records added per year : ....

7. Does the database contain equipment population data and/or operational data which allows accident frequencies/rates to be estimated?:

    ☐ Yes

    ☐ No

8. Criteria for including incidents in the database:

    ☐ Chemicals involved   Specify:..

    ☐ Type of hazardous event   Specify:..

    <u>Severity:</u>

    ☐ Near misses   Specify:..

    ☐ Number of fatalities   Specify:..

    ☐ Number of injuries   Specify:..

    ☐ Material losses > quantity Specify:..

    ☐ Financial losses > value   Specify:..
        (US $)

<div align="right">(continued...)</div>

☐ Environmental losses   Specify:..

☐ According to gravity scale. Specify:...

☐ Other.   Specify:..

(please tick all boxes that apply)

9. Do you have data exchange arrangements with other database operators?
    (This information will not be included in the directory)

☐ Yes. Specify: ....

....
☐ No

◘ ◘ ◘ ◘ ◘ ◘ ◘ ◘

Other information which may not necessarily be included in the directory (e.g. present/planned developments, etc.):