MANAGEMENT OF OPERATIONAL INFORMATION IN A MAJOR OIL SPILL. THE ERIKA AND PRESTIGE EXPERIENCES

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ABSTRACT

In 1999-2000, the response operations to the exceptional Erika pollution (400 km of coastline affected, totalling 400 000 man days of work until summer 2002, 260 000 t of oily waste) highlighted the importance of a daily archiving of operations data and swift exploitation of that information. Satisfactory performance was achieved as regards the map production of overall activity and results, but no real time maps and diagrams, accurate enough to be used as decision aids, could be produced.

When the Prestige incident occurred, in 2003, Cedre proposed to the coordinating authorities in charge of coastline response in France (Civil Defence Zones) to install computerised networks in their Headquarters in order to collect and exploit data about quantity and origin of manpower involved in real time, the amount and characteristics of collected waste, the different techniques, material and products used on response sites. Thanks to this initiative, head response authorities had graphical summaries on their desks daily, synthesis maps weekly, and a complete, fully updated visual situation for each key meeting with the Central authorities, in which budgetary needs for the weeks to come were discussed.

The handling of data exploitation was managed according to the necessity of transmitting the information quickly to decision makers in a crisis context. We first had to send data in a hurry daily or weekly: they were diffused in an approximate and simplified way to enable a quick analysis of the information. Afterwards more time could be taken to complete and validate the information to allow a more detailed exploitation work. They can now be considered in retrospect.

The quick transmission, processing and communication of the information helped avoid some inappropriate responses like excessive waste collection for example (a situation which we had to face during the Erika response phase).

The Prestige experience proved once again the strength and significance of illustrations (graphics or maps) especially in an emergency situation as sensitive as this one: they carry much more power of conviction for decision makers and the public than pages of complex explanations.

ERIKA and PRESTIGE: two major accidents in figures.

The Erika oil spill has impacted over 400 km of shoreline along five "departements" (local government areas) (Girin & al, 2000). Hundreds of cleanup sites were set up and shoreline cleanup lasted more than two years. More than 400 000 days of work were necessary until summer 2002 (voluntary help was not taken into account), and 260 000 t of oily waste were collected (fig. 1).

The Prestige oil spill has impacted over twelve "departements" (Tiercelin & al, 2003). Cleanup involved 84 000 days of work and 27 000 tons of waste were collected.

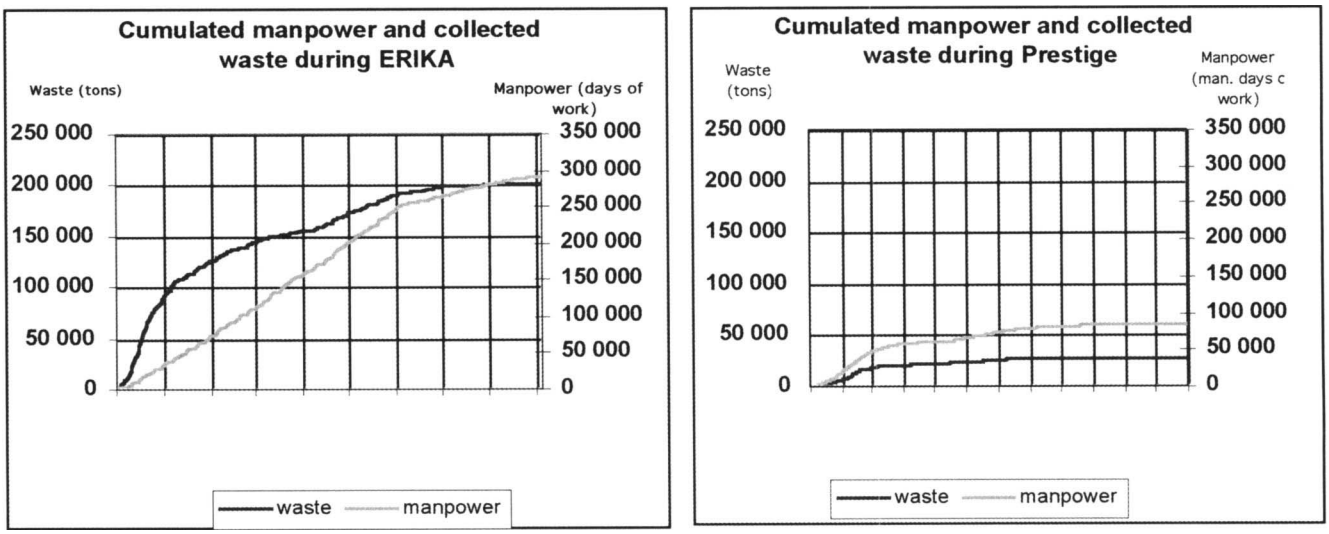

FIGURE 1: COMPARATIVE CURVES BETWEEN THE EVOLUTION OF MANPOWER DEPLOYED AND WASTE COLLECTED DURING THE CLEANING OPERATIONS OF ERIKA [1] AND PRESTIGE.

The scale of the response generated a huge quantity of data to collect, then organise and analyse. So when an incident occurs, it is essential to gather, then process information concerning both the pollution characteristics and the response operations. This aims at tracking the situation's evolution and keeping response teams and crisis managers involved as well as providing a defensible audit trail for post incident analysis (Mauseth & al, 2003).

ERIKA (12/12/1999): Information, archiving and post incident analysis

The team in charge of collecting and analysing information during Erika was confronted with many problems. The most important was that no organization was officially in charge of this activity, so there wasn't any data centralization (Poupon & al, 2002).

The Erika archive was improvised. There wasn't any systematic daily capture of information, so the archives, which began one year after the Erika, were difficult to compile (crisis headquarters were closed, people in charge had changed ...) (Juhel & al, 2002).

Another problem was that the paper forms concerning cleanup sites were not standard and homogeneous (fig. 2). Many different templates were used, and information and accuracy of data varied from one form to another. Often, information provided was approximate.

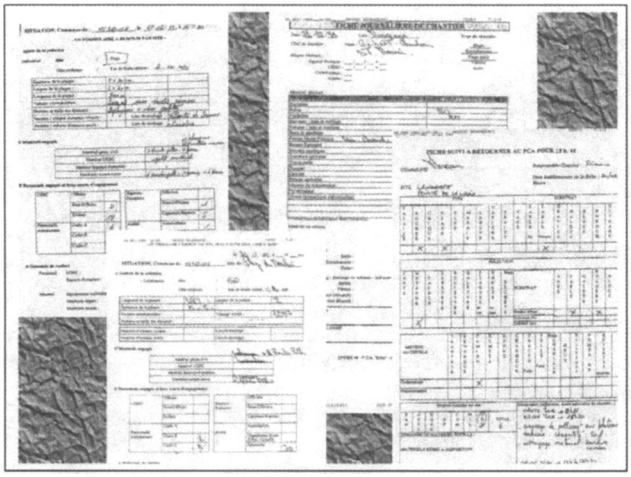

FIGURE 2: CLEANUP SITE INFORMATION: EXAMPLE OF THE DIVERSITY OF PAPER TEMPLATES,

Information management experience from Erika allowed us to reassess the needs in this field: coordination between responders, homogenization and standardization of data (numeration and data format), centralization, exploitation and fast diffusion (databases, GIS, Internet). New tools are essential for this type of crisis.

Maps and graphs published during the Erika showed data mainly on a macro scale (departments or country as illustrated in figure 3) and less on a worksite one. Those documents were generally produced subsequently so were useful as a data archive and also to compare the efficiency of the various techniques used when working on post incident analysis but not really as helpful decision tools.

PRESTIGE (13/11/2002): A decision support system on a global level

Using experience from the Prestige incident, Cedre built up a Data Management System on POLMAR[2] activities (fig. 4). It manages in real time cleanup sites' data and operational objectives on different information levels, and aims at defining the response strategy. In batch processing, it provides an analytical, technical and statistic archive tool (Gouriou & al, 2004).

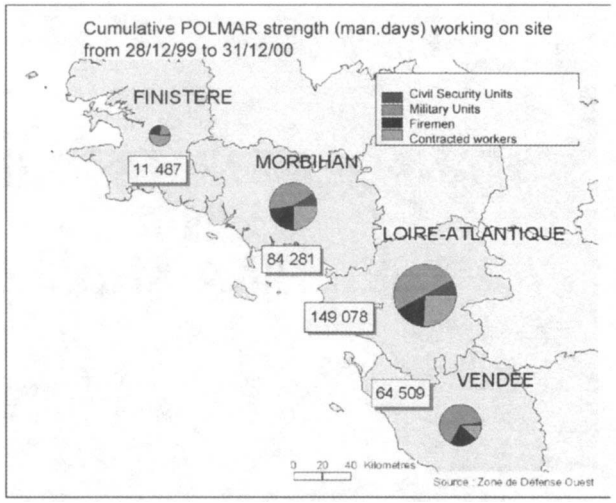

FIGURE 3: SUMMARY MAP OF THE MANPOWER DISTRIBUTION BY CATEGORIES DURING THE POLMAR PLAN, IN THE CONTEXT OF THE ERIKA.

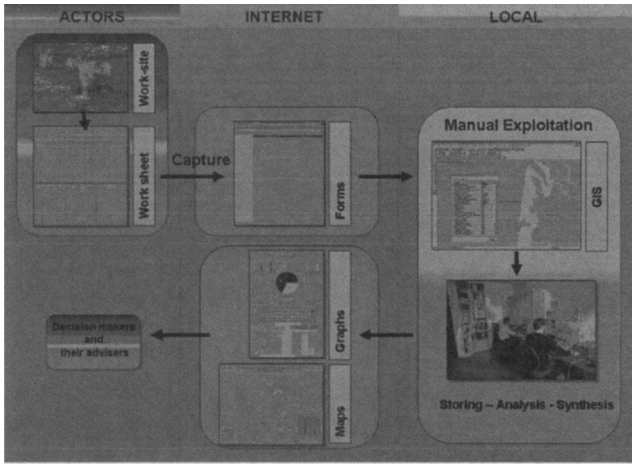

FIGURE 4 : WAY OF RAISING INFORMATION DURING PRESTIGE

From the first groundings, we gathered data on land operations, and set up a data flow input process to avoid information losses.

Data management purpose is to display the evolution of cleanup operations on land. These charts were delivered each week to authorities in charge of pollution response. Information was tailored to the particular audience e.g. national, civil defence area, departmental.

Maps about landings and active sites were published daily. More specific maps (corrected when necessary) were published weekly. They showed, among others, manpower origins and forces per site as well as the kind of engaged actions and collected waste (fig. 5 & 6).

On a national scale, these maps helped to make decisions on the means to use according to landings and collected waste. They were also useful for post incident analysis (fig. 7). They were less used on a local scale because completed data were not transmitted in real time so could not be exploited on a daily basis.

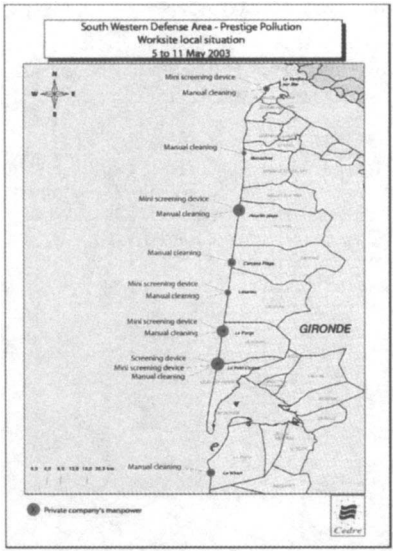

FIGURE 5: LOCAL MAP ABOUT CLEANING METHODS AND MANPOWER FORCES DIFFUSED WEEKLY.

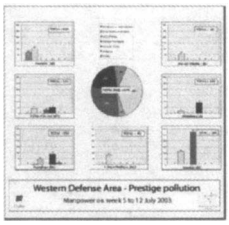

FIGURE 6 : EXAMPLE OF GRAPHS ABOUT MANPOWER DISTRIBUTION BY CATEGORIES AND DEPARTMENTS FROM 5 TO 12 JULY

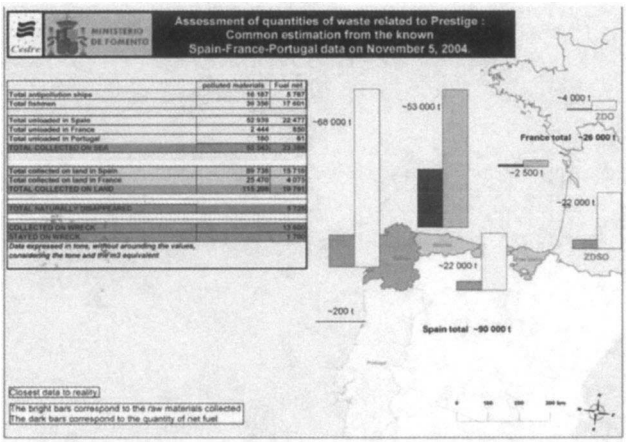

FIGURE 7 : SUMMARY MAP ABOUT THE EVOLUTION OF WASTE DURING PRESTIGE WITH THANKS TO THE SPANISH MINISTRY OF EQUIPMENT FOR THEIR CONTRIBUTION AND COLLABORATION.

FUTURE ACCIDENTS: Improving the decision support system on a local level and in real time

By our experience in Erika and Prestige, we have identified and prioritisedihave identified and prioritisedhhh the needs and the limits of data management. Management of operational information should be given deeper consideration in order to achieve, as a priority, a better standardization of data gathering and processing through the development of information tools, such as Geographical Information System and databases on the Internet (Lamarche & al, 2003), (Laflamme & al, 2003).

During the Prestige, a data capture tool was developed on the Internet but all the data exploitation was carried out on a local computer. In the future, Cedre foresees exploiting data directly on the Internet, together with the validation phase. This will improve data diffusion and access to all responders. Chart format and specific database requests would have to be defined before the creation of the tool. Automatization functions will be developed to reduce the delay of exploitation, but the system would have to remain flexible to answer the different requests. Some GPS systems compatible with GIS could be deployed on the field to help site location and pollution surveys (fig. 8). In the future, we could enhance this system by adding environmental data and GIS data from Polmar Plan (Kerambrun & al, 1997), (Sydner & al, 2003).

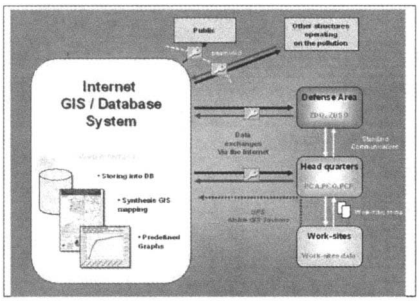

FIGURE 8 : THE FUTURE SYSTEM'S ARCHITECTURE IMPROVING REAL TIME EXCHANGES ON SEVERAL LEVELS

No other tool today allows both the capture of pollution data and its GIS exploitation and publishing in real time over the Internet. The technologies used are all Open sources (Linux and MapServer), so the development could be used through other projects, and the decision support system will be upgradeable.

When a new accident occurs, data will need to be transmitted in real time when possible. At the moment, computerized tools are being developed in collaboration with local authorities. They will be tested during an exercise phase, and then validated and we hope become operational for the next pollution incident.

REFERENCES

GIRIN M., Circumstances and interest of a Nakhodka—Erika, Exchange of experience seminar. From the Nakhodka to the Erika, Conference proceedings of *Cedre*, Brest, France, 2000, 162p.

GOURIOU V., CABON R., GIEU V., GIRARDOT A., LEPETIT A., Data management system concerning both pollution monitoring and response operations during an oil spill: the Prestige experience, Iinterspill 2004, Trondheim, NORWAY June 14-17 2004.

JUHEL C., GUICHARD L., BOUINEAU L., KERAMBRUN L., Erika : sites data recording. Data Base on means used for cleaning operations in the Département of Morbihan. Safer Seas—Leçons de l'Erika, Brest France, March 13- 16 2002.

KERAMBRUN L., DAVID L., REBOUT C., PAGE-JONES L., Oilspill preparedness : an operational atlas for French authorities, International Oil Spill conference 1997, Fort Lauderdale, Florida, April 7-10 1997.

LAFLAMME A., PERCY J., Sensivity mapping—with flare! An internet approach to environmental mapping. International Oil Spill conference 2003, Vancouver, Canada, April 6-11 2003.

LAMARCHE A., GUNDLACH E., Use of GIS and digital orthoquads to support inspection and operations during oil spill response, International Oil Spill conference 2003, Vancouver, Canada, April 6-11 2003.

MAUSETH G., CSULAK F., Damage assessment and restoration following the Julie N oil spill : a case study. International Oil Spill conference 2003, Vancouver, Canada, April 6-11 2003.

POUPON E., GOURIOU V., Réfexion sur la gestion de l'information lors d'une pollution marine accidentelle : l'archivage de l'Erika. Safer Seas—Leçons de l'Erika, Brest France, March 13- 16 2002.

SYDNER B., BARCHERS C., Emergency mapping for crisis management, International Oil Spill conference 2003, Vancouver, Canada, April 6-11 2003.

TIERCELIN C., POUPON E., French response to the "Prestige" oil spill Observations and lessons learned Comparison with the response to the Erika spill. 4th seminar on marine environment protection, Rio de Janeiro, Brazil, November, 19-21, 2003.

[1] POLMAR (MARine POLlution) : specialised intervention plans to be applied to major accidental marine pollutions. It allows the mobilisation and coordination of the fighting means of the sate. The on land Polmar plan is directed by the department Prefects.

[2] Data about evolution of manpower and waste during Erika incident are only available up to september 2000