PRESENTATION OF THE COMEX DIVING DATA BASE

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The comex diving data base

As a commercial diving company, Comex has used a system of diving reports for the monitoring of its operations.

The diving reports are first legal documents required by the legislations. They are also working documents allowing operational personnel to run specific check lists, go through pre-defined schedules and keep records of relevant parameters. These reports contain invaluable information on operations, but the difficulty has always remained how to process this mass of information to benefit from the offshore experience.

In 1974 Comex started a computer system to process its diving reports and try accessing efficiently to this information. The system was named the Comex diving data base (Cx DDB) and has been kept running ever since through several revisions and updates. This data base has permitted some remarkable achievements, specially in decompression procedures development, and is still surviving as perhaps the unique example of a commercially run diving data base.

Ownership and availability of the data

The Cx DDB is operated by Comex and is oriented toward the company needs. The first reason is that part of the information contained in the reports, specially in the accidents reports, is confidential and could not be released without precaution. The second reason is that the market for such information does not have much prospect. This does not means that the Cx DDB has no commercial relevance but rather that its implications are indirect.

The computer control of the company safety records is the first achievement. This has been used to built a company image among insurers or clients and remains the principal justification of the system.

The statistical approach to the decompression sickness analysis is the second accomplishment. Supports were obtained from the French Government for research projects based on the Cx DDB for the improvement of the French air decompression procedures.

Source of the information

All the data typed in the Cx DDB come from the Comex dive reporting system which includes three different forms :

- the diving reports, which are filled in by the diving supervisor when ever a dive is carried out.
- the chamber logs, filled in by the life support technicians, which contain the information related to chamber ambient parameters, but also details of the treatment in case of a decompression sickness,
- the accident reports, which are used in case of illness or injury or DCS.

These reports are supplied offshore in pads with auto-copying sheets. One sheet remains on the site, one goes to the project files, and the last one is sent to the safety department at Marseille.

It is our experience that the report lay out is critical to get a good return of the information. Comex forms have been revised several times. The first forms were as large as a news paper and included too much information to get any chance to obtain it all. The last revision is only on an format A4 and constitutes a compromise in between what we would like to get and what the supervisor will care to fill in.

The system has been run since 16 years and now functions quite routinely and satisfactorily. It contains over 150,000 diving reports collected from world wide operations. An average of 15,000 dive reports are added each year, along with 1,000 saturation reports and 150 accident/near-missed forms.

Collection of the information

The first well recognized difficulty of a data base is to get the information, all the information. This is not critical for dive reports which can be numbered (a missing report is immediately identified and correlated to project invoicing) but is critical for the accident reports.

It is clear that, for instance, if the decompression sickness incidence is low, the omission of one accident report will significantly alter the general statistics. Unfortunately, it has been recognized for long that the number of reported cases does not always corresponds to the number of actual accidents and that safety statistics tend to minimize the problems.

One of the reason is administrative. Operational people just hate paper work and it is not easy to get all the reports, all the times, fully completed.

The second reason is related to the difficulty of diagnosis of the decompression sickness. There are clear cases that are treated with the right procedures, but there are also mild cases such as niggles that are often given some oxygen on mask or not treated at all.

The last reason is related to the impunity of reporting an accident which is sometimes considered as personal failure. We have learnt how important it is to get the cooperation and the confidence of the operational personnel. We have advertised the system, shown its contribution to the procedures development and now believe that the Cx DDB is recognized as an useful tool. We also often edit personal dive history for divers visiting the department to impress them with the system capacity. We recognize the limit of the system but we trust that with time, the system will become better and better.

Processing the information

Once this information is collected, it still has to be validated because the quality of the input information commands the reliability of the output results. A sample screen display is presented in fig. no 1 for an air dive.

The information is first cross-checked with complementary information obtained from worksites safety inspections, annual examinations at Comex medical center, or simply informal conversation with people dropping in the office.

The information is then verified for consistency. We used to employ operational personnel during the winter season for the job but we now run computer automatic verification. The present technology permits to have on time testing of the input data, thus allowing the typist to rapidly investigate the report in case an abnormality is detected.

The computer for instance checks the consistency of breathing mixture and depth, diving method and depth, decompression table and diving method. It also compares the time sequences, the storage depth and working depths, the actual dive depth and time to tables depth and time, etc. In a batch treatment, trend analysis is run at a worksite level and area level to detect singular points. Such a comprehensive validation has permitted to reduce the time required to enter and verify the data.

Typing the information in

Personnel cost is the key to the database viability. The Comex data base history has been a constant trade off between the information we would like to obtain and what Comex could afford to pay for it.

In the early time of the data base, which corresponded to the golden age of commercial diving, the project team was impressive. There were a computer consultant, a person in charge of collecting the reports, life support technicians hired to code the information and control its validity, professional typists to punch the cards, plus further engineers involved in the data analysis .

In 1985, during the "recession", the team was reduced to one computer engineer assisted by a chamber operator for 6 months a year.

Nowadays, the future of the Cx DDB is based on splitting the work by dispatching the computer programme to the local operational centers and relying on the safety department secretaries to type the reports in.

This evolution is inevitable inside a commercial diving company. It was made possible by restricting the objectives to the essential, safety control and procedures development, and also by using improved computer technology. Effectively, in 1975, only 50 reports were entered in the computer per day. In 1985, the score was around 200 reports a day. With the new system, we expect to reach 300 reports a day.

Hardware and software

The computer technology give us the feeling of living in a wonderful world as new products are offered each year that double the possibilities of your last year system. Comex first system was installed on an early ICL main frame with cardboard cards and tapes. In 1978, it was transferred to a fancy IBM system with a terminal installed in the department. The last version runs on an AT sitting on a corner of a desk. It is clear nowadays that even with a moderate budget, hardware is not a problem for a diving data base.

Similarly, a large variety of softwares packages are offered to structure the database. Of course every one is looking forward the next revision of his favorite software but it must be admitted that present products allow to develop a database quite easily using fancy scrolling menus and colored windows. The first programmes written for Comex were developed during 2 years at the University of Marseille in the early 70's. The last revision of the system was designed in 6 months by a summer student using DBASE III.

The only worry is that this fast evolving technology introduces difficulties because the extreme variety of computers and lack of standards. It is our experience that exchanging data between two so called compatible micro computers is not always as simple as expected.

Conclusion

To our opinion, the quality of a diving data base relies on the following points :

- the relevant diving activity should be accessible, with a large enough volume and reasonable consistency (depth, mixtures, procedures).

- there should be an efficient system of reporting to collect this information,

- there should be strong incentive/motivation for people to report the information. A diving company pays its diving supervisors, Navies relies on discipline, Government bodies on regulations but other organisms may have difficulties in convincing operational people to do the paper work,

- professional expertise should be available to check and validate the stored information.

- in case of problem, cross checking of the information should be possible by contacting people involved.

We would also like to mention the fact that a data base should have clear and limited objectives that draw the financial support from manager and authorities.

Figure no 1 : Sample of the Comex Diving Data Base screen corresponding to an air dive report.