

**THE DIVING INCIDENT MONITORING STUDY  
DIVE TABLES AND DIVE COMPUTERS**

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**Introduction**

This paper is an analysis of the data about diving computer and dive table use reported to the Diving Incident Monitoring Study (DIMS) to the end of 1993.

**Method**

The incidents reported to the Diving Incident Monitoring Study that involved decompression sickness (DCS) were examined for dive computer or dive table use. Incident reporting does not specifically analyse DCS incidents but can be used to examine the errors that contributed to the decompression accident.

**Results**

In the 880 reports received 433 involved “diver harm”. Two hundred and twenty eight of these were involved reports of DCS, which was 26% of all reports.

There has been a gradual increase in the number of reports received in which a dive computer has been used to plan the dive, not only as the sole decompression guide but in combination with the use of dive tables. The percentages range from 10.4% in 1989-90 to 32.9% in 1993. Overall computers were used in 238 dives, 27% of the reports (Table 1).

In the incidents involving the use of a dive computer 90 resulted in DCS while the majority of the other 138 DCS incidents were associated with dive table use. However, there is an increased association between dive computer use and DCS when compared to those divers using a set of dive tables, while the rate of DCS amongst

dive computer users and those divers using neither a dive computer nor a set of dive tables was the same (Table 2).

With deep dives, defined as dives to or deeper than 30 m, there was also an increased rate of DCS among those divers using only a dive computer, compared with those using a dive table. The rate of DCS among all divers using a dive computer, which includes the group using tables and a computer, was the same as those divers not using a dive table or dive computer to plan their deep dive (Table 3).

One hundred and seventy one incidents involved poor dive planning. The criteria were repetitive dives that were associated with a surface interval of less than 1 hour and when the deepest dive was the last dive of the day, although none of these dives were to deeper than 30 m. Of these poorly planned dives 93 involved “diver harm” with 67 cases of DCS. In the dives harming the diver there was an increased rate of DCS in divers using a dive computer compared with either divers using dive tables or using neither a set of dive tables nor a dive computer (Table 4).

Failure to understand or misreading a dive table was a contributing factor in 53 reports and 39 of these involved morbidity. The US Navy tables were cited as those the hardest to understand.

There were 72 reports where the dive profile was considered to be poor. The criteria were slow descent to depth, deepest part of the dive not being at the beginning of the dive and multiple ascents (yo-yo diving). Of these, 26 involved the use of a dive computer in which there were 18 cases of DCS (69%), 37 involved the use of a dive table in which there were 23 cases of DCS (62%) and 9 did not involve the use of a dive table or a dive computer in which there were 5 cases of DCS (56%).

In the 238 incidents where a dive computer was used there were few reports of computer failure (Table 5). The users of the four inaccurate computers all developed DCS, while only one of the two whose computers stopped working did so.

**TABLE 1  
COMPUTER USAGE IN 880 DIMS REPORTS 1989-1993**

| Year         | Reports received | Computer alone |             | Computer and dive tables |             |
|--------------|------------------|----------------|-------------|--------------------------|-------------|
|              |                  | Number         | %           | Number                   | %           |
| 1989-1990    | 125              | 10             | 8.0         | 3                        | 2.4         |
| 1991         | 152              | 12             | 7.9         | 26                       | 17.1        |
| 1992         | 266              | 27             | 10.2        | 49                       | 18.4        |
| 1993         | 337              | 51             | 15.1        | 60                       | 17.8        |
| <b>Total</b> | <b>880</b>       | <b>100</b>     | <b>11.4</b> | <b>138</b>               | <b>15.7</b> |

**TABLE 2**

**DECOMPRESSION ILLNESS  
IN 880 DIMS REPORTS 1989-1993**

| Diver used                  | Reports | DCS | %   |
|-----------------------------|---------|-----|-----|
| Dive computers              | 100     | 40  | 40% |
| Dive computers and tables   | 138     | 50  | 36% |
| No computer or tables       | 103     | 37  | 36% |
| Dive tables or not recorded | 539     | 101 | 19% |

**TABLE 3**

**DECOMPRESSION ILLNESS AND DEEP DIVES**

| Diver Used                    | Deep dives | DCS cases | % of Deep dive DCS | DCS % by dives |
|-------------------------------|------------|-----------|--------------------|----------------|
| Dive computers                | 25         | 16        | 37.2               | 64             |
| Dive computers and tables     | 26         | 12        | 27.9               | 46             |
| No computer or tables         | 9          | 5         | 11.7               | 56             |
| Dive tables or not recorded   | 52         | 10        | 23.2               | 19             |
| Both groups of computer users | 51         | 28        | 65.1               | 55             |

**Conclusion**

From DIMS data there is an increased association in the rate of DCS in dive computer users when compared to those divers using a dive table. This is particularly evident in dives that are to 30 m or deeper. However, to discover why there is this increased rate of DCS in dive computer users would require a study in which many factors are controlled and standardised. However DIMS data shows that dive computers are mechanically reliable.

The deepest dive not being the first dive of the day is common. Poor dive profiles are not confined to any one group of divers and show a lack of understanding of gas uptake and elimination. A failure to understand the US Navy Tables may indicate poor diver education.

Repetitive dives following a surface interval of less than one hour are not uncommon. Repetitive dive planning

**TABLE 4**

**93 REPORTS WHERE A POOR DIVE PLAN  
CAUSED HARM**

| Diver used                    | Morbidity | DCS cases       |
|-------------------------------|-----------|-----------------|
| Dive computers                | 16        | 15 (94%)        |
| Dive computers and tables     | 9         | 8 (89%)         |
| No computer or tables         | 44        | 25 (57%)        |
| Dive tables or not recorded   | 24        | 19 (79%)        |
| <b>Total</b>                  | <b>93</b> | <b>67 (72%)</b> |
| Both groups of computer users | 25        | 23 (92%)        |

**TABLE 5**

**PROBLEMS NOTED WITH 238 COMPUTERS  
USED**

| Problem                     | Number | Harm | DCS |
|-----------------------------|--------|------|-----|
| Computer stopped working    | 2      | 1    | 1   |
| Computer inaccurate         | 4      | 4    | 4   |
| Unable to read numbers      | 2      | -    | -   |
| Forgot to activate computer | 1      | -    | -   |

does not appear to be made any easier or safer by using a dive computer. Repetitive dives that are unplanned, that is using neither a dive computer nor a dive table, have the same risk of DCS as those dives planned using a dive computer among DIMS incidents.

The same DCS rate among divers who planned their dives using a dive computer and those who did not use a dive computer or dive table may indicate the random nature of DCS.

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