

2. Situations where accidents occurred due to pitching, etc.

2.1 Sea conditions and navigational conditions at the time of accident

This type of accidents is caused by **pitching of the ship's body**. When the ship's body pitched up and down and the bow is lifted, bodies of the anglers were lifted up and fell.



As a result of classifying 18 accidents due to pitching, etc. by sea condition and navigational condition, the following facts were found out.

(1) Sea conditions at the time of accident

i. Wave direction

The wave direction was classified. **In most of cases, the accidents occurred by receiving waves from the bow direction** (See Table 1).

Table 1: Wave direction at the time of accident

Wave direction					Unit: case
From the bow	From the starboard bow	From the port bow	From the stern	Unknown	Total
11	4	2	0	1	18

ii. Wave height

As a result of classifying the wave height, we found out that 7 accidents were caused by high waves over 2.0m. It was also found out that **some accidents were caused by waves around 1.0m**. For example, 4 accidents by waves between 1.0~1.5m and 1 accident by waves between 0.5~1.0m.

It should be noted that when the wave height is described with a range in investigation reports, the minimum value is adopted (See Table 2).

Table 2 Wave height at the time of accident

Wave height (m)	Number of accidents	%
Lower than 0.5	0	0
0.5 ~ lower than 1.0	1	6
1.0 ~ lower than 1.5	4	22
1.5 ~ lower than 2.0	3	17
Higher than 2.0	7	39
Unknown	3	17

(2) Speed

After we classified the speed, we found out that 7 accidents occurred at the speed between

5~10 knots. On the other hand, we found out that a **number of accidents have occurred at a relatively low speed** of “slow” and “lower than 5 knots”.

It should be noted that when the wave height is described with a range in investigation reports, the minimum value is adopted (See Table 3).

Table 3: Speed at the time of accident

Speed (knots)	Number of accidents	%
Slow	1	6
Lower than 5	1	6
5 ~ 10	7	39
10 ~ 15	4	22
15 ~ 20	4	22
Higher than 20	1	6

2.2 Seating position of anglers and state of their injury

25 anglers were injured by accidents due to pitching, etc.

(1) Seating position

The seating position of anglers was classified. 24 anglers were injured at the front (bow) and **most of accidents occurred at the bow side** (See Table 4)

Table 4: Seating position of anglers

Seating position	Number of	%
Front (Bow)	24	96
Midship	1	4
Rear (Stern)	0	0

(2) Type of injury

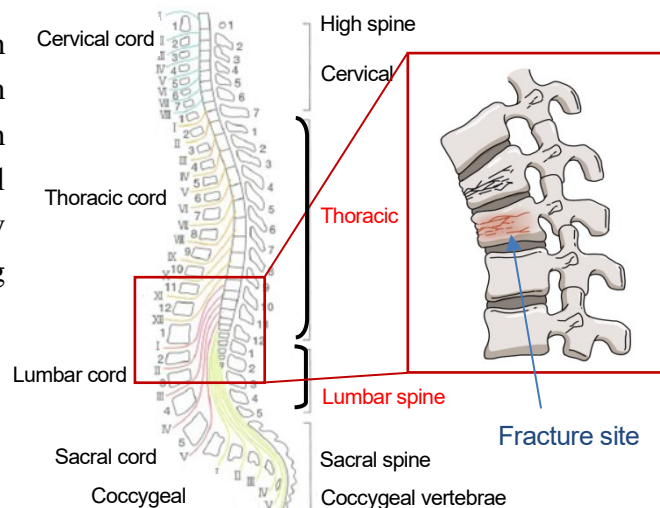
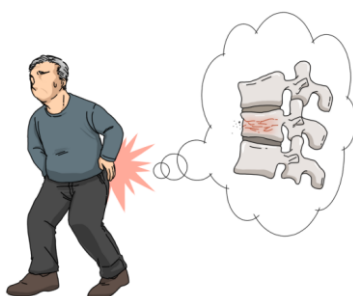
When we classified the type of injury of anglers, it was found out that **14 anglers experienced vertebral fracture (about 60%)** (See Table 5).

Table 5: Type of injury of anglers

Type of injury	Number of	%
Vertebral fracture	14	56
Other factures	7	28
Bruise	3	12
Others	1	4

Reference

Vertebral fracture refers to compression fracture in which the spine suffers from hyperflexion injury and burst fracture in which the spine is damaged due to vertical axial compression. The spine may be damaged by shocks or external forces due to fall and falling on one's bottom.



Reference: Examination Standard for Orthopedic Specialist Vol.1: Spine and Spinal Cord