

4. Questionnaire and pilot interviews on close call incidents

In order to ask the opinions of pilots on the close call incident cases including wake turbulence and wrong approaches introduced here, questionnaires and interviews were conducted with the cooperation of the Japan Aircraft Pilot Association.

- **Questionnaire on cases of close call incidents**
126 people responded to the questionnaire.

Question 1. Have you ever experienced being engulfed by wake turbulence during operations?

Yes 53.9% (68 respondents)
No 46.1% (58 respondents)

Question 2. How did you respond in order to avoid an accident when being engulfed by wake turbulence?

- **Take control, maintain posture, and confirm the altitude and speed.** (13 similar response)
- **I changed the flight path.** (9 similar response)
- **I broke the approach because I was making an approach, and changed the course to a direction where I believed there was no wake turbulence.** (4 similar response)
- **Honestly, I was not able to respond because it was a sudden encounter.** (3 similar response)
- **I encountered it when descending following Haneda STAR (standard landing route) through the VNAV (instrument landing method). I avoided it by turning off autopilot and lowering the descent rate.** (3 responses including the change in the ascent rate)
- **I didn't respond in any particular manner because I was able to escape from the wake turbulence soon.** (3 similar response)
- **I turned on the seat belt sign.** (2 similar response)
- **I kept my hand on the control and monitored it to ensure that banking did not exceed 30 degrees with autopilot kept being engaged.** (1 similar response)
- **Because it was a low altitude during the final approach, I conducted a go around by using more power.** (1 similar response)

Question 3. Have you ever nearly made a runway incursion during taking off or landing or wrongly entered in a taxiway in the past?

Yes 31.7% (40 respondents)
No 68.3% (86 respondents)

Question 4. How did you respond in order to avoid an accident when nearly making a runway incursion during taking off or landing or a wrong entry to a taxiway?

- **I stopped temporarily and confirmed. We confirmed it together (two persons).** (9 similar response)
- **I prevented a wrong entry by confirming with the control tower “Confirm RWY XX ?” while taxiing.** (8 similar response)
- **There were no problems because it was pointed out by another crew member.** (6 similar response)
- **I conducted a go around when the mistake was recognized and made an approach once again.** (4 similar response)
- **I thoroughly ensured confirmation with the controller and visual confirmation.** (2 similar response)
- **Because there was a sufficient distance with related traffic, it was possible to avoid the risk of an accident.** (2 similar response)
- **I immediately noticed that we were about to take the wrong entry to the taxiway, so I asked for permission to taxi from the grand controller and checked that there was no other aircraft nearby.** (2 similar response)

Question 5. Have you experienced any other close call incident during operations in the past?

Yes 59.5% (75 respondents)

No 40.5% (51 respondents)

Question 6. How do you act in order to avoid accidents when you sense a close call incident?

- **First, I stay calm and find out why that situation occurred.** (7 similar response)
- **I experienced a settling-with-power on a helicopter. As there was not much leeway in terms of altitude, I avoided the situation by increasing forward speed.** (5 similar response)
- **I responded by staying calm and communicating between the two of us.** (4 similar response)
- **While taxiing after landing, I discovered another aircraft at an intersection of taxiways to the right and immediately stopped. As the aircraft also stopped, there was no major accident. There was a distance of 20m to 30m between my aircraft and the other aircraft.** (4 similar response)
- **After I had entered into an unexpected control zone after misunderstanding the landing AD (airfield), I exited the control zone after communicating with control to reconfirm and receive clearance.** (3 similar response)
- **Go around when landing and brake while taxiing.** (2 similar response)
- **As there was a sudden appearance of cumulonimbus clouds in the flight course, I turned back and changed the course to the destination mid-flight.** (2 similar response)

○ **Interview on cases of close call incidents**

We talked with incumbent Pilot A and former Pilot B about close call incidents involving wake turbulence and wrong approaches.

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About wake turbulence

—Have you ever experienced wake turbulence?

A: Small aircraft are susceptible to wake turbulence. This is especially the case when they follow large aircraft. I have also experienced wake turbulence, and I think the degree of impact differs depending on the size of the aircraft.

—Have you ever noticed that wake turbulence occurs in certain circumstances?

A: Depending on the wind direction, there are times when wake turbulence is felt and times when not, under the same conditions.

—Is an impact caused by the meteorological conditions and the preceding aircraft?

A: When a control officers leads my aircraft on the same route as the preceding aircraft, as aircraft are susceptible to turbulence when flying lower than the preceding aircraft, I prevent turbulence by flying at a high altitude.

—So, altitude also affects the chance of wake turbulence, right?

A: While one is more susceptible to wake turbulence if you pass underneath a flight path, as the turbulence spiral can be avoided if the wind is blowing strongly, whether or not wake turbulence is experienced can also depend on the wind.

—Do pilots know if they are experiencing wake turbulence or not?

A: I think that most pilots have experienced wake turbulence.

B: If there is a preceding aircraft and you are a pilot, you usually keep wake turbulence in mind. However, it is difficult to know how to respond when you actually experience wake turbulence. Even if you are told to be careful of wake turbulence at the time of takeoff, we cannot say “OK, I’ll wait for one minute.” There seems to be something we can do but doesn’t really much you can do when it comes to the wake turbulence.

- When a small aircraft takes off following a large aircraft, a wait of three minutes is current guideline for takeoff, or two minutes for cases other cases. What kind of a wait should there actually be?

B: That depends on the weather conditions. The chance of wake turbulence is low if the wind is blowing. I believe that changing takeoff intervals in line with weather conditions could be an effective preventive measure.

—Do you ever redo landing in order to avoid wake turbulence?

B: I don’t know of any pilots brave enough to redo landing when the aircraft isn’t even shaking.

Unintended entry to runways and taxiways

—I would like to talk about unintended entry to runways and taxiways.

A: It is more likely to make a unintended entry at airports with complex taxiways.

B: While there are some airports where lighting is used to provide guidance on your route, it is more likely to make unintended entry to taxiways at airports that are not like that.

A: In order to prevent unintended entry to taxiways, the latest aircraft models have been equipped with aircraft navigation systems called EFB. If you use these systems, you won't get lost even at night.^(*1)

B: As it has become normal to land using instruments, I don't think it would be normal to make a wrong approach if there are no problems with instrument input. On the other hand, there could be mistakes when landing based on visual inspection at times.

— Does the experience of the pilot affect whether or not there are mistakes?

A: Experience is not the only thing that matters. Conversely, in some cases it is experienced pilots that are overconfident and go too fast, which leads to mistakes.

B: Just because you are a veteran does not mean that you do not make mistakes. It is said that the ultimate way of avoiding mistakes is for a person who is not piloting to calmly confirm.

— Are there many cases of unintended entry at airports overseas?

B: If it's the first time that you have been to an airport in a while, you may make a mistake even if you have the layout in your mind. For this reason, I have been told to confirm the number of the runway.

A: Once a pilot makes an assumption, it can be difficult for them to escape from these assumptions. If this happens to the pilot, the only person who can assist is the first officer. A means of preventing unintended entry would be for the first officer to serve as the person to say "Captain, that is wrong" as the final gate. In such a case, team ability as the crew would prevent mistakes rather than individual ability. This is because there are limitations in individual abilities.

— What do you do in order to respond as a crew?

A: One of the things is education as a company. Regularly gathering together pilots and considering past cases of close call incident in order to raise awareness more and more encourages the First Officer to have the awareness that "I must make suggestions to the captain as a member of the crew in cases like this." At the same time, education is also provided to captains in order to create a positive workplace environment that makes it easy for the First Officer to speak.

Other cases of close call incidents

— Do you remember any close call incidents other than wake turbulence or unintended entry to runways and taxiways?

A: When landing by visual inspection overseas, the control officer asked whether we could see the preceding aircraft that was in front of our aircraft during approach, and the captain said "I could see it" because shadow of the aircraft could be seen in front. As we followed because we thought that we would land after that aircraft, we made a mistake on the aircraft we should have followed.

B: I have a story about communications with ATC (air traffic control). When flying with foreign crew members,

there was a case in which it was difficult to hear the difference between left and right, and the crew and I heard something different. After confirming once again with ATC, it turned out that the native crew heard it incorrectly.

As a case related to confirming the things you hear with your ears, at one airport there was a captain who tried to make a quick takeoff after being given takeoff permission from a takeoff position and then being told something else by ATC. While what the ATC had said was that takeoff permission had been canceled, it seems that the captain misheard that as “go quickly” after our aircraft number had been read again.

— **In the serious incidents introduced by the Japan Transport Safety Board, there were also cases of mishearing what air traffic control had said.**

A: The most common incidents related to air traffic control involved similar flight names. For every airline there are many similar flight names during about the same time period. As everyone makes communication mistakes in these cases, recently they have added letters to the end of flight names like “xxxx alpha” as a countermeasure.

Cases of close call incidents not involving pilots

— **Have you heard of cases of close call incidents not involving pilots?**

A: I have heard a case involving printer paper in a computer. While this paper differs by model, in one case it wasn't possible to print, and after checking it seemed that the paper for a different model was being used.

B: In the past, there were cases of the gear pins being removed from the gears (wheels) of parked aircraft and then forgotten, and gears could not fit in the cabin after takeoff as a result. In response to this, so that removed gear pins would not be forgotten, mechanics must show the gear pin at the time of taxiing out for confirmation by the pilot in the aircraft.

A: Most human errors are a result of there not being enough time. While we properly check things if there is time, when there is time pressure we may not really look at the things that should be confirmed despite our intentions. As the pressure caused by time is the thing that most affects human error, I make sure to confirm things even when I know that I don't have much time.

B: The biggest source of time pressure is the “curfews”^{(*)2} that airports have. When an airport has a curfew this means that if you don't complete preparations for takeoff by that time, you will have to take off the next day, and all the work you have done up until then will go to waste. This means that you have to be careful when you are hurrying in order to be on time.

*1. However, because taxiing relying only on EFB is prohibited in regulations, the use of EFB is only for reference purposes.

*2. What “curfew” means here is the start of the time period when the arrival and departure of aircrafts is prohibited at specific airports.