PREFACE

We pray for the soul of the cabin attendant who was injured in the accident of JAL706 and passed away twenty months later, and also express our concern to others for their injuries.

We strongly reiterate here our resolve to ensure the safest operations in the future.

We assert that the Nagoya District Public Prosecutors Office's prosecution on May 14 of the captain who was involved in the accident is an unreasonable response, and point out that there are two mistakes in their decision: 1) deciding the cause of the accident, and 2) adopting the ground. This document addresses the points at issue in the Accident Investigation Report compiled by the Accident Investigation Committee which provided a substantial basis for the prosecution.

The considerations in this document are based on the facts and data available to us at present (July 2002). We will verify new data and proceed to clarify the actual causes of the accident. Although some points may be highly technical and difficult to understand, we encourage you to read the document. (Some of the descriptions have avoided technical terms to facilitate your understanding.)

1 Outline of JAL706 Accident

- On June 8, 1997, JAL706 started descending over the Kii Peninsula on route from Hong Kong to Nagoya.
- During the descent, the airspeed of the aircraft increased rapidly, the autopilot system did not work properly, and the nose was brought up sharply, causing the autopilot system to disengage.
- Due to the up and down motions of the nose, the passengers and cabin crew who were not restrained by seatbelts were injured.

2 Gist of the Indictment

Foresightedness, obligation of avoidance, faulty action and consequence

Foresightedness:

If the airspeed increases rapidly during descent, the following can be expected to happen.

1. Strongly pulling the control wheel toward the pilot will automatically disengage the autopilot and rapidly bring up the nose.
2. Adjusting this nose motion will cause repeated up and down motions of the nose.
3. Shocks caused by the nose motions will cause a risk to passengersl life or body.

Captain's responsibility of avoidance:

The captain has a responsibility to avoid expected risks by taking the following actions.

1. To disengage the autopilot mode by pressing the disengage button of the autopilot.
2. To reduce the increased airspeed without applying excessive force to the control wheel, for instance, by manually operating the control wheel to raise the nose.

Captain's fault:

The captain made the following mistakes in operation.

1. He applied excessive force to the control wheel by pulling it too hard.
2. He repeated the adjusting control several times to recover the pitch attitude of the aircraft.

Result:

The autopilot was unintentionally disengaged by hand, causing the nose to rise sharply and then up and down motions to be repeated due to adjustment of the pitch attitude, which resulted in death and injuries.

3 Actions taken by the captain

- As the captain received information that light turbulence was expected during the descent 25 minutes before the accident, he passed the information together with an expected time of the turbulence to the cabin attendants, and turned on the "Fasten your seat belt" sign three minutes before the turbulence started.
- As the airspeed rapidly increased during the descent, he tried to reduce the airspeed by using the autopilot to reduce the descent rate but the autopilot did not react properly.
- Since the MD-11 type of aircraft is known to have the characteristic that manual controls at high altitude will make the aircraft unstable, the captain did not disengage the autopilot when he found it did not react properly, but tried to reduce the airspeed by using the speed brake (deployed on the wing upper surface to increase drag).
- Severe pitch upset occurred immediately after the speed brake was deployed, but he could not identify the movements of the aircraft for a few seconds because of strong forces induced by the aircraft motion.
- After a few times of pitching, he noted that the mode of pitching changed when he closed the speed brake. At that moment, he recognized that the autopilot had already been disengaged and that the nose was ascending with automatic movement of the control wheel toward him. So, he made the aircraft stable by manual controls and reengaged the autopilot. Thereafter, the aircraft became stable.

4 The prosecution has made a double mistake in concluding the cause of the prosecution and the adoption of its ground.

●First mistake

This prosecution is essentially the pursuit of criminal liability based on an Accident Investigation Report that was announced by the then Ministry of Transportation in December 1999 and is considered to contain many problems. However, as already disclosed by us, the contents of investigations described in this report are completely inadequate, and especially the presumed cause of the accident that "the autopilot was disengaged by the captain's overriding forces" is completely wrong.

●Second mistake

ICAO Annex 13 ratified by the Japanese Government provides that "Various records acquired from accident investigations should not be made available for the purpose other than investigation". Therefore, the present prosecution conflicts with the ICAO Annex 13.

5 The probe of the Accident Report involves serious misconception of the facts.

The conclusions in the Report are the same as those described in the indictment, namely:

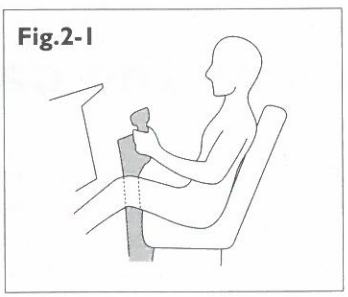
- The autopilot was disengaged because the captain pulled the control wheel.
- The nose rose sharply because the autopilot was disengaged.
- The nose subsequently moved up and down five times because the captain pulled the control wheel back and forth.

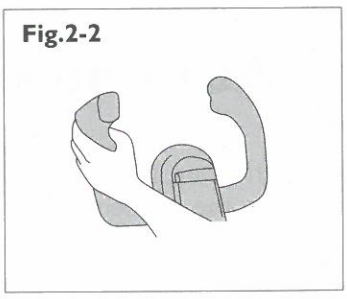
However, verification of the Accident Investigation Report involves serious misconceptions.

6 Did the captain pull the control wheel?

6-1 Is there any record showing that he consciously pulled the control wheel?

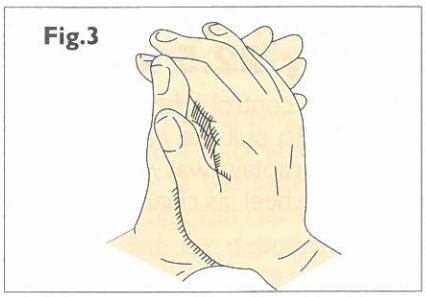
The Accident Investigation Report concluded that the recorded flight data is evidence proving that the captain consciously operated the control wheel. The data in question was obtained from the CWS (control wheel sensor), which detects manual force applied to the control wheel for manipulating the elevators (Fig. 1) in order to control pitching of the aircraft (Figs. 2-1 and 2-2).





A force detected by the CWS will naturally be recorded when the pilot pulls the control wheel, but force applied to hands placed on the control wheel by movement of the wheel caused by the autopilot, will also be recorded. During the flight, when the autopilot lowers the nose, the control wheel will automatically move forward. If the pilot's hands are placed on the control wheel, the force applied to his hands by the automatic movements of the autopilot will be recorded as if the pilot himself pulled the control wheel.

For instance, if you position your left hand with the palm facing forward, and push it towards you using the palm of your right hand, it feels as if your left hand is pushing your right hand backward, when in fact, your right hand is pushing your left hand forward. If you think of your left hand as the control wheel on which the pilot's hand is placed, and think of the force used by your right hand as the force moving the control wheel forward (caused by the autopilot), it is easier to understand the mechanism of the CWS sensor (Fig. 3).



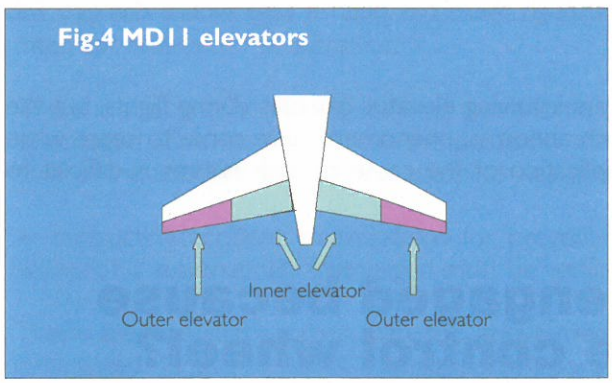
Furthermore, data will also be recorded of the force even when the pilot is simply grasping the control wheel during the flight using the autopilot, or the force caused by body movement when the pilot holds the control wheel with his left hand and operates the autopilot switches, which are installed on a panel off the pilot's seat.

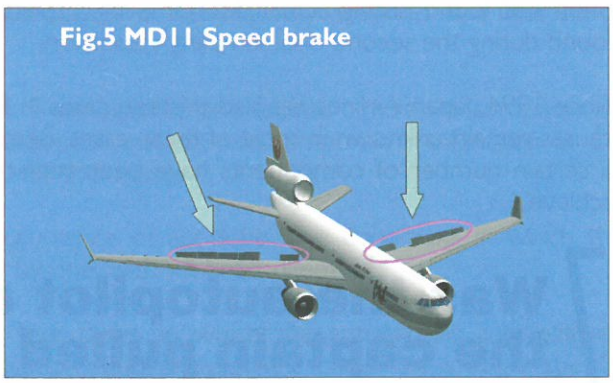
As mentioned above, it is possible for the CWS to record such delicate forces without the pilot's motion of pulling the control wheel.

6-2 Did the elevators work incoherently because the captain pulled the control wheel?

The Accident Investigation Report concluded that incoherent movements of the elevators of both sides was the reason for disengaging the autopilot and that the incoherent movements were caused by the captain pulling the control wheel. An aircraft of the MD11 type has four elevators, one of which is controlled by the autopilot. The other three elevators are mechanically connected and follow the movement of the autopilot (Fig. 4).

The flight data of daily schedules shows that the movements of the four elevators are incoherent, and particularly when an speed brake (airspeed-reducing equipment deploying on the wing upper surface to induce drag, see Fig. 5) is deployed the respective elevators sometimes move in directions completely opposite to each other.



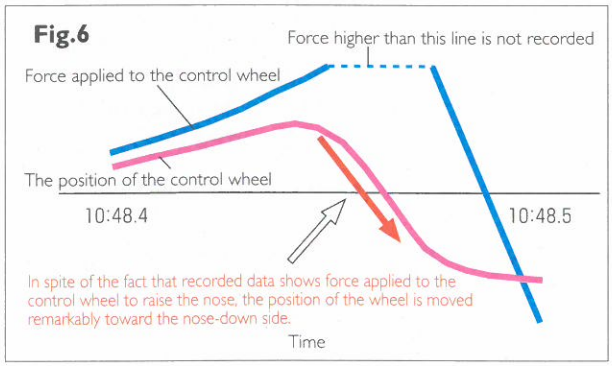


On the other hand, the flight data obtained from the recorder shows incoherent movements of the elevators. However, this data was recorded at a point when the autopilot was still working. Even if the captain had pulled the control wheel, the autopilot should have reacted in an opposite direction to recover from the situation. However, an opposite movement was not observed on the record at the time when the autopilot was disengaged, but instead shows all four elevators moving in the same direction. In other words, the data indicates that the captain was not pulling the control wheel.

6-3 Was the control wheel position ignored?

According to the recorded flight data, the position of the control wheel was remarkably moved in the direction for lowering the nose at the time that force was applied to the control wheel to raise the nose (Fig. 6).

It is not possible to manually change the force being applied to the control wheel to a direction opposite of the movement of the control wheel. This fact is to be construed as "The control wheel was automatically moved (by autopilot operation) while the captain's hand was simply placed on the control wheel." To construe this as "The captain pulled the control wheel," is not based on fact, and is incorrect.



The Accident Investigation Report concluded that "the captain pulled the control wheel" because the force applied to the control wheel indicated a nose-up direction, but the position of the control wheel was ignored, and the analysis is incorrect.

6-4 The force required to pull the control wheel for releasing the autopilot was approximately 22.5 kg!

Applying a force of approximately 22.5 kg (2 rice packs of about 10 kg each) to the control wheel for longer than one second is required to disengage the autopilot. It is, however, very difficult to pull the control wheel with a force of 22.5 kg with a single hand only. When the accident occurred, the captain was operating an speed brake with his right hand while his left hand was simply placed on the control wheel, as clearly proven in experiments conducted by the JAL Captains' Association.

6-5 Does the remaining failure record prove that the captain pulled the control wheel?

The failure record left on JAL706 shows that "there was a difference between the signal from the autopilot and the actual position of the elevator." The Accident Investigation Report concluded that this difference was a result of the captain pulling the control wheel.

However, three cases of accidents similar to the JAL706 Accident have occurred with the JA8580, the same aircraft as JAL706, within nine months after the JAL706 Accident, in which a sudden nose-up motion occurred due to failure of the autopilot. In all of these cases, there were malfunction records which described that "there was a deviation between the signal from the autopilot and the actual position of the elevator" remaining in the recorder. But, the control wheel would not be pulled at all while the autopilot is in use, and such data was presumably created due to a temporary failure.

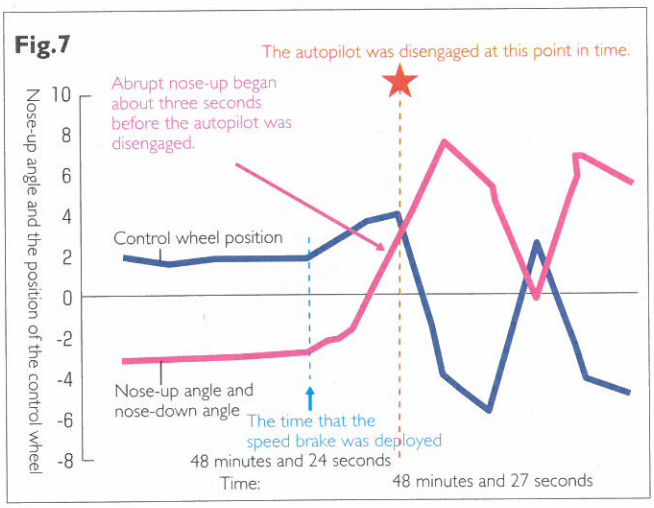
Such failures of the autopilot could occur as a result of slight damages to the elevator's actuator, which are often not found during actual disassembling inspections, although there has been a case where damage was found during the second disassembling inspection.

Since 1994, Japan Airlines has had thirteen cases in four years involving elevator troubles during flights, but the causes remain unknown in most of these cases. Because such abnormal phenomena have come to cease while a certain number of components have been replaced, clarification of the cause of such failures is difficult to achieve.

7 Was the autopilot disengaged because the captain pulled the control wheel?

7-1 The autopilot was disengaged after the abnormal nose-up motion occurred.

Fig.7



According to the Accident Investigation Report, the reason for the abnormal nose-up motion is that the captain pulled the control wheel to inhibit an increase in airspeed and disrupted the autopilot, thus causing a sharp nose-up motion. However, as previously explained, it is obvious that the captain did not pull the control wheel.

On the flight data record, the abnormal nose-up motion began about three seconds before the autopilot was disengaged.

This fact indicates that the abrupt nose-up did not occur as a result of disengaging the autopilot, but rather the autopilot was disengaged after the abrupt nose-up motion occurred (Fig.7).

It is assumed that the reason for this is that the autopilot could not cope with the simultaneous actions of the three factors affecting the nose-up motion.

1. The aircraft fell into a nose-up tendency due to the rapid increase of the airspeed and the autopilot could not cope with it (the nose rises with an increase in airspeed).
2. At the same moment, the speed brake was deployed to inhibit an increase in airspeed, promoting a nose-up tendency (use of a speed brake promotes a nose-up tendency).

3 Furthermore, the auto-throttle suddenly accelerated the speed of the engine to an unusual degree (an increase in the propulsive force also promotes a nose-up tendency).

Due to the overlapping of these factors, it can be determined from the flight data records that the nose-up motion started automatically, in spite of the movements of the elevators. Using an automobile as a comparison, the situation is the same as an automobile that changes direction before the driver has turned the steering wheel. No one can claim that the directional change was caused by a manual operation in this case. This can be used as data for disputing the opinion of the prosecution that "a pitch attitude change was caused by the captain's operation," as mentioned in the Accident Investigation Report.

7-2 The reason why the autopilot was disengaged?

Why was the autopilot disengaged?
The Accident Investigation Report only mentions, "the reason why the autopilot was disengaged is that the captain pulled the control wheel." Nevertheless, the manual for the MD11 autopilot lists the following four conditions for disengaging the autopilot:

1 Excessive G in a vertical direction (for example, force applied to a rider on a jet coaster)
2 A Rapid rolling of the aircraft
3 Excessive inclination bank angle of the aircraft
4 Remarkable deviation between the position of each elevator and the commands from the autopilot

*The autopilot will be disengaged if the pilot continues to pull the control wheel with a force of approximately 22.5 kg for one second or longer, as already explained, although this was originally designed as a function to interrupt failures of the autopilot.

There is a record for JAL706 showing that a force over 1.6 G was applied one second before the autopilot was disengaged. This would indicate the possibility that the autopilot experienced temporary malfunction at the time of the accident and that the autopilot was disengaged for that reason.

In conducting accident investigations for preventing reoccurrence of accidents, the conditions in which the autopilot is automatically disengaged must be verified, one by one, without preconception.

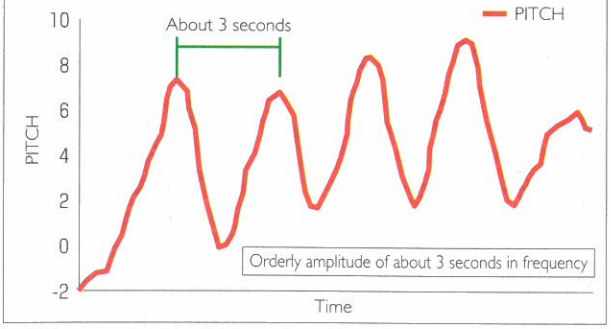
There are conditions other than the above-mentioned four cases, in which the autopilot is automatically disengaged. In the Accident Investigation Report, investigations and analyses are based on a single specific condition, and we cannot help but assert that the investigations and analyses are inadequate.

8 Is the up-and-down motion of the nose after disengaging the autopilot attributable to the captain who pulled the control wheel?

The Accident Investigation Report concludes that "five incidences of up-and-down motion of the nose after the autopilot was disengaged, were caused by the captain repeatedly pushing and pulling the control wheel in an attempt to recover the pitch attitude of the aircraft." However, verification in the Investigation Report includes a serious misconception.

8-1 The nose motion being too accurate

Fig.8 Up-and-down motion of the nose



Data from JAL706 indicates that the repeated up-and-down motion of the nose occurred five times in 15 seconds. The characteristics of this motion are a very accurate frequency of about "three seconds and also an accurate wave curve" (Fig. 8). But, there are no pilots who believe that controls of such constant frequency can be achieved by a human act, because pilots are not machines.

8-2 Controls under large G are unrealistic.

Force applied to the aircraft of JAL706 exceeded 2 G immediately after the sharp nose-up motion occurred and reached 2.78 G at its maximum. One second later, minus 0.5 G was recorded. Such a remarkable change in G was repeated every 1.5 seconds for 15 seconds thereafter.

A force of 2.78 G is equal to 2.78 times as much as the average weight of the human body, which means that such a severe change would be similar to that of a body being pressed down by a weight of approximately 200 kg and then lifted up 1.5 seconds later, repeating the action every 1.5 seconds, with a seat making an up-and-down motion of 5-7 meters in height. Such a state is similar to a rodeo ride, and control would clearly be impossible.

When there is a substantial change in the movement of the nose during the flight, a large G will be generated in a longitudinal direction. If a large G is applied in a back-and-forth direction, the pilot's body will be forced to sway back and forth and, consequently, manual force applied to the control wheel will vary. Nevertheless, the effects of G-force in a back-and-forth direction are not taken into consideration in the Accident Investigation Report.

8-3 Artificial continuation of the up-and-down motion of the aircraft is impossible with the MD-11 type aircraft.

The MD-11 type aircraft has a longitudinal stability augmentation system (LSAS), which is a device used to increase the stability of the pitching motion of the aircraft. One of its functions is to reduce remarkable changes in the pitch attitude of the aircraft. It has the capability to operate the elevators regardless of the control wheel.

Since its appearance in service, the MD-11 aircraft has experienced repeated accidents, such as abnormal deployment of the high-lift device and severe pitching motion in turbulence; therefore, improvements were made to enhance the stabilization function of LSAS by adding a pitch-rate damper (PRD). The PRD functions to inhibit the pitching motion by forcing the elevators into reverse directions when controlling a sharp motion of the nose.

Thus, as long as the PRD is working normally, quick control of the pitching motion by using the control wheel has become impossible, and this improvement had already been completed at the time of the JAL706 accident.

8-4 Accident Investigation Committee admits, "Reproducibility is impossible."

The Accident Investigation Committee conducted an experiment to reproduce the accident by using a simulator (imitation flight model), but the committee admits in the Accident Investigation Report that they were unable to reproduce the repeated pitching motion as experienced during the accident. As a matter of fact, it was impossible for them to repeat a cyclic pitching motion twice, in spite of their efforts.

A pitch-rate damper (PRD) works effectively as long as the aircraft is in proper order. The controls experienced in the JAL706 accident are artificially impossible under those conditions.

8-5 Relationship between the speed brakes and the pitching motion

According to the Accident Investigation Report of JAL706, the abnormal nose-up motion and the subsequent pitching motion began almost simultaneously with the deployment of the speed brake, and terminated soon after closing the speed brakes. This data cannot be clarified by analysis of the Accident Investigation Report.

Generally, deployment of the speed brakes leads to a nose-up tendency and wake caused by the speed brakes affecting the efficiency of the elevators that control the pitching motion. Unlike other types of aircraft, the speed brakes of MD11 type aircraft are fully deployed inclusive of the inner brakes during the flight. Consequently, disturbance of the air current passing through the speed brakes affects the elevators and is likely to significantly reduce the efficiency of the elevators under specific circumstances (Fig. 9-1). With respect to 747-400 type aircraft, the inner speed brakes are limited to deploy during the flight, thus having no influence on the elevators (Fig. 9-2).

Fig.9-1 MD speed brakes

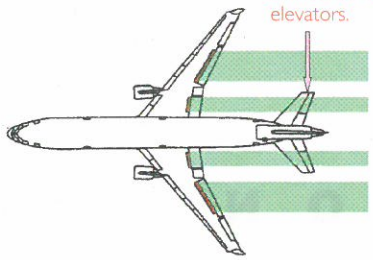
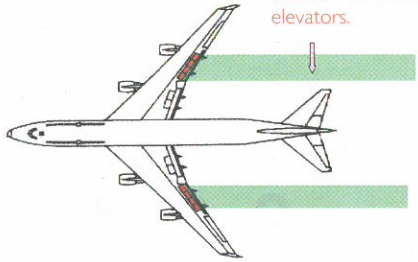
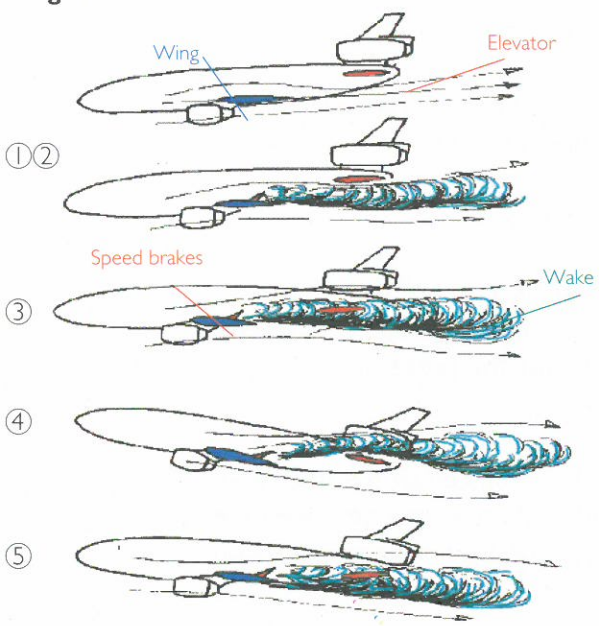


Fig.9-2 -400 speed brakes



The relationship between the speed brakes and the pitching motion is expected to be as follows (Fig. 10):

Fig.10

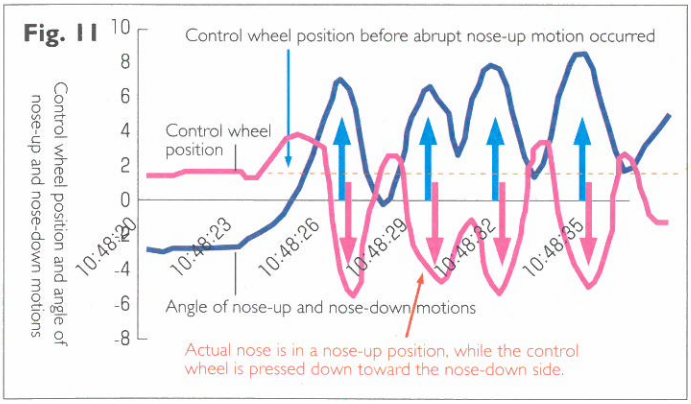


1. The nose-up tendency resulting from full deployment of the speed brakes for airspeed reduction.
2. Wake generated by the speed brakes has substantial effects on the elevators and reduces the efficiency of the elevators. Consequently, the elevators are unable to inhibit the nose-up tendency resulting from use of the speed brakes, thus leading to a sharp nose-up motion.
3. However, the elevators cannot inhibit the nose-up motion until they become free from the effects caused by the wake generated by the speed brakes. During this period the PRD, which was added to improve the functions of the LSAS, is expected to keep the elevators in a position for the nose-down motion.
4. When the elevators are no longer affected by the wake that was caused by the use of the speed brakes as a result of a relatively sharp nose-up motion, the elevators quickly recover and the pitching motion begins.
5. The elevators are affected by the wake generated by the speed brakes when the nose is lowered. They will not inhibit a nose-up tendency and the nose-up motion begins again.

As explained above, it is assumed that the pitching motion was continued by the elevators, which were affected once and then repeatedly not affected by the wake generated by the speed brakes. The record of JAL706 supports this assumption.

8-6 The record indicates that the control wheel was pushed forward but never pulled back.

Fig. 11



At first glance, the flight record appears to indicate that the pilot pushed the control wheel forward and then pulled it back. However, when comparing the positions of the control wheel when the nose repeatedly moves up and down, it is observed that the control wheel is most often pressed down toward the nose-down side. The control wheel is seldom pulled up to the nose-up side. Thus, we can see that the pitching motion is not caused by pressing or pulling the control wheel (Fig. 11).

C O N C L U S I O N

As outlined above, the decision made by the Nagoya District Public Prosecutors Office to prosecute the captain of JAL706 includes dual mistakes: one regarding the determination of a cause, and the other regarding the adoption of its basis. In other words, one is the "pursuance of penal responsibilities based on the Accident Investigation Report, which contains an incorrect presumptive cause," and the other is a "conflict with a provision in Annex 13 to the International Civil Aviation Organization (ICAO) convention that prescribes that 'various records acquired from accident investigations should not be made available for purposes other than investigations of the accident.'"

We understand that this prosecution presents a problem for all crew in Japan. Under a solid unity of all crew gathered by their respective unions, we intend to thoroughly wage battle against the prosecutors' reckless act.

The objective of an accident investigation is to ascertain the true cause of an accident and to prevent reoccurrence. At the same time, we have the significant responsibility of conducting investigations and studies on how we can minimize damages resulting from the accident.

In the case of injuries, investigating the circumstances, how and why the injuries occurred, as well as investigating the cause of the actual accident, are essential in investigations of aircraft accidents. In the past, many investigations of overseas accidents included studies on how the extent of injuries could be decreased and how to promote new measures for cabin safety.

On the other hand, the Accident Investigation Report of JAL706 lacks detailed descriptions about the causes of injuries that occurred, and there have not been sufficient investigations. In order to learn from the JAL706 accident, we will take up, in succession, the problem of preventing occurrence of injuries and the safety of the passenger cabins.

We ask for your understanding and support in our effort to prove the captain's innocence and to prevent recurrence of accidents. Thank you.