【Revised Edition】

ATC Communication Handbook

For Preventing Runway Incursions

English version

September 2025

Civil Aviation Bureau, Ministry of Land, Infrastructure, Transport and Tourism（JCAB）
Japan Aircraft Pilot Association (JAPA)
Air Traffic Control Association, Japan (ATCAJ)

Table of Contents

Purpose of this handbook

Ensuring the safe operation of aircraft is the primary mission for both controllers and pilots. However, a mission statement is not sufficient on its own to achieve operational safety.

In particular, runway incursion is a serious safety concern with a potential for catastrophic consequences. While technological measures such as the implementation of Runway Status Lights (RWSL) and enhancements to the runway occupancy monitoring function have been introduced as incursion countermeasures, we also need to take effective action to address potential threats in radio communication between controller and pilot (hereinafter called "Air Traffic Control (ATC) communication"), a factor which can lead to human error.

Analysis of past runway incursion incidents from the perspective of ATC communications has revealed important points that both controllers and pilots need to be cautious to prevent such events. The Ministry of Land, Infrastructure, Transport and Tourism (MLIT), together with relevant organizations, published the initial version of this handbook in March 2011 which contained situations requiring heightened awareness to avoid runway incursions in the hope that it would promote mutual understanding between controller and pilot.

In the wake of the January 2024 Haneda Airport runway collision, MLIT established the Haneda Airport Aircraft Collision Prevention Measures Review Committee, and in June 2024, the Committee released an interim report in which recommendations were made to update "The ATC Communication Handbook" by adding case studies of recent runway incursions. This ATC Communication Handbook is MLIT's product to the Committee's recommendation as these case studies offer invaluable lessons and should be applied proactively to educate controllers and pilots during training and practice sessions. Furthermore, MLIT partially amended the Civil Aeronautical Act and relevant regulations to expand mandated CRM training operators beyond major air carriers, which was made into law in June 2025.

It is our hope that this Handbook will continue to be widely utilized not only in the training of controllers but also in CRM training programs for pilots.

Lessons learned from the past runway incursion incidents

Analysis of runway incursion incidents revealed that the majority of the runway incursions were caused by ATC communication errors. For instance, a pilot acting on a misunderstood ATC instruction, without realizing the mistake. Another example of common miscommunication is that, despite strict adherence to the prescribed ATC procedures and phraseology※ by the controller, the instructions or information failed to convey the intended message to the pilot due to lack of clarity.

In light of the above, controller and pilot should not focus on "Who is at fault?", but instead approach this issue from the viewpoint of "How can runway incursions be prevented?", identifying and ensuring consistent adherence to best practice to prevent runway incursions.

Strict adherence to rules and procedures is a fundamental expectation of the controller and pilot during radio communications. Furthermore, the controller should pay extra attention to figure out how to effectively convey the intended message and consequently control aircraft movement by ensuring the pilot accurately responds to the instructions. Similarly, pilots need to pay extra attention to find ways to ensure an accurate understanding of the ATC instructions and act upon them appropriately. Controller and pilot are encouraged to jointly identify situations when and where "extra attention“ is particularly necessary.

※The prescribed ATC procedures and phraseology: "Government of Japan procedures and standards for safety of flight & efficiency of air traffic management"

“Communication Loop” is the key

The analysis of runway incursions revealed important considerations to keep in mind.

➢It is a fundamental premise that controllers need to make accurate judgements based on situational awareness, then communicate necessary information to pilots using correct phraseology. If this premise is undermined, we are one step closer to the danger of a runway incursion.

➢As long as controllers make accurate judgments and communicate instructions using correct phraseology, and pilots understand and act on the instructions appropriately, runway incursions rarely occur. For a pilot to translate ATC instructions into actions as intended, the pilot must receive instructions accurately and, furthermore, the pilot must ensure correct understanding of the instructions before proceeding.

➢Readback is done by the pilot nearly 100% of the time to ensure correct understanding of the controller’s instructions. However, analysis revealed that controllers often fail to sufficiently verify these readbacks. This indicates that “hearback” by a controller— who is supposed to correct any errors in readback—is sometimes not functioning.

➢Even when pilots correctly receive, confirm, and understand the controllers’ instructions, there are still cases where pilots unknowingly deviate from controller instructions.

“Communication Loop” becomes the key to address these issues.

1 .Establishing the communication loop

In the past, because Pilot Monitoring (PM) was mainly responsible for communicating with ATC in dual pilot operations, potential threats of runway incursions existed due to lack of effective intervention, which allowed errors to go undetected. This safety concern led to the development of the pilot-controller "Communication Loop", a safety mechanism to ensure information is accurately acknowledged by the intended receiver of the information with absolute certainty.

However, fully performing the communication loop throughout the actual flights is not easy. One primary reason is that both pilots must be thoroughly familiar with the logic behind the mechanism of the communication loop for it to function properly. Even then, when frequency congestion gets so bad to the extent that there is no break in transmissions during high workload, pilot may not be able to maintain the prescribed loop. For example, inappropriate authority gradients※ between the Pilot Flying (PF) and the PM can also hinder effective execution of the communication loop.

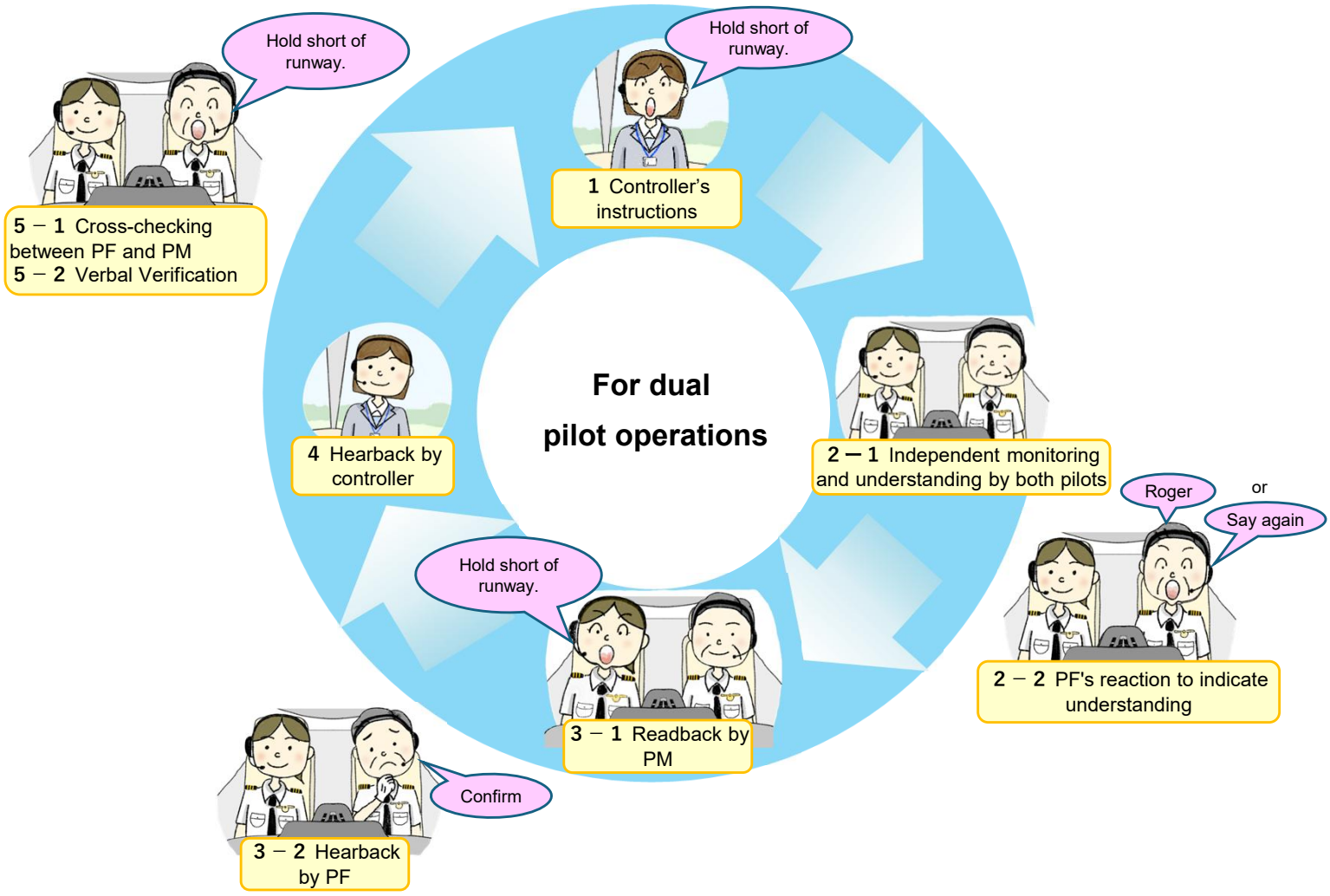
However, by understanding and practicing the logic behind the communication loop, the quality of ATC communication can be significantly improved for both dual and single pilot operations.

2 .The five steps of the communication loop

The communication loop consists of five steps as applied to either dual or single pilot operations.

※Authority gradient: the perceived power distance inherent in relationships, such as between a captain and a co-pilot, or a senior and a newcomer. When the authority gradient is too steep, individuals in lower positions may hesitate to speak up, which can lead to critical issues. It is important for a higher-ranking individual to foster an environment where individuals in lower positions feel comfortable speaking up, and for individuals in lower positions to assertively raise concerns (a practice known as "assertion") despite the authority gradient. However, an excessively shallow authority gradient has its own problem as it can lead to familiarity, where decision-making responsibilities become blurred.

For dual pilot operations



1 Controller's instructions

The controller uses standard phraseology. If the controller uses plain language, the controller is required to communicate with accuracy and clarity.

2 – 1 Independent monitoring and understanding by both pilots

Both PF and PM independently monitor and understand the instructions. It is a key point that they neither verbalize what they understand, nor discusses the instructions with each other if ATC instructions are unintelligible. This minimizes the risk of PF and PM reinforcing each other's incorrect conformed assumptions. Independent monitoring also enables the PF to monitor the PM's readback.

2 – 2 PF's reaction to indicate understanding

If the PF understands the instruction, the PF acknowledges with "Roger" (or a thumbs-up) to the PM. If the ATC instruction is unclear, the PF says "Say again" and has the PM request the controller to say again. When the PM does not understand the instruction, even if the PF signals understanding, based on the independent monitoring process, the PM must then request the controller to retransmit, saying "Say again intersection" for example, until full understanding is achieved.

3 − 1 Readback by PM

After the PF expressed acknowledgement, and the PM also independently achieves understanding of the instruction, the PM reads back the instruction as he or she understood it.
Safety-critical ATC instructions—such as for takeoff, landing, runway crossing, taxiing on runway, holding on runway and holding short of runway—must be read back in full, not just responding with “Roger” or “Wilco.”

3 − 2 Hearback by PF

The PF monitors the PM’s readback and if it differs from what the PF has understood, PF immediately says “Confirm” or “Say again” to the PM. This is “hearback in the cockpit,” the importance of which that confirmation of the content of the communication is reinforced through hearback in the cockpit instead of relying solely on the controller. If the PF says nothing, it implicitly means that the PM’s readback matches PF’s understanding.

4 Hearback by controller

The controller listens to the pilot’s readback to ascertain that the clearance or instruction has been correctly acknowledged by the pilot and shall take immediate action to correct any discrepancies or omissions revealed by the pilot readback or request “Say again” of the crucial information.

5 − 1 Cross-checking between PF and PM

In the case of cross-check based on hearback, the PF verbalizes his or her understanding to the PM to verify that the PM's understanding aligns with the PF's own interpretation of the instructions. This ensures both pilots share the same understanding.

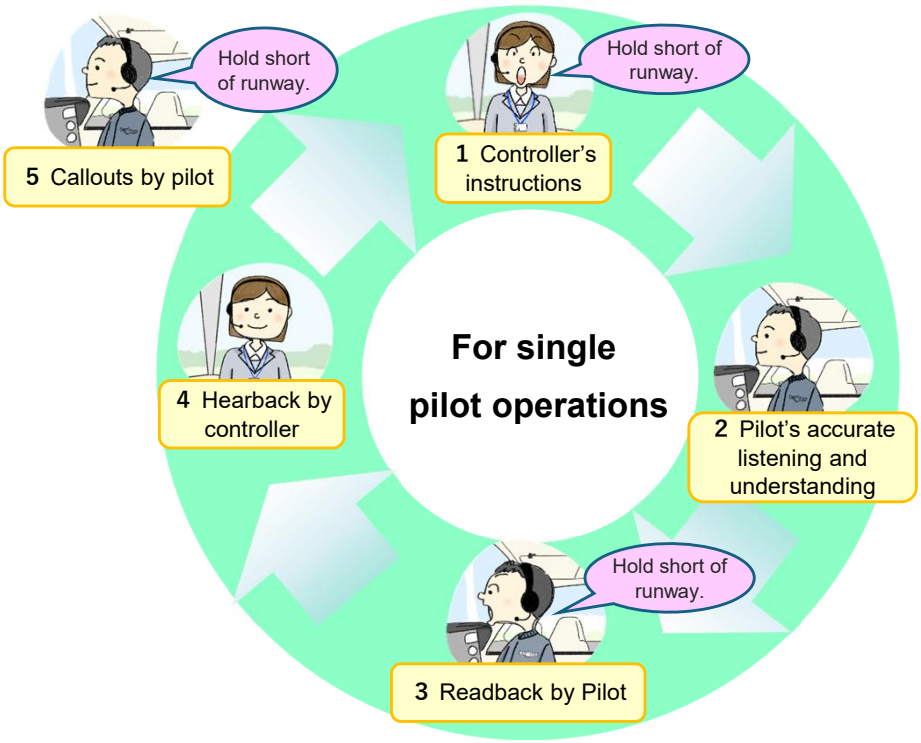
5 − 2 Verbal Verification

A potential issue in the next step concerns the pilot-airplane interface. That is to say, even if the PF understands the instructions, the PF may still make a mistake in the execution of said instruction. To avoid such problems, the PF must verbalize his or her actions while completing such actions. The PM monitors the PF’s actions. The PM also verbalizes his or her observation of the PF to ensure the PF’s actions are completed as intended. For example:

1) PF resets the FMS/Flight Mode
2) PF verbalizes the FMS/Flight Mode
3) PM monitors PF and verbalizes resetting the FMS/Flight Mode
4) PM ensures PF’s actions match intent
5) PF and PM both verbalizes the PFD, a device which provides information for altitude and navigation control status

This is called “Verbal Verification”. This action serves to minimize error by PF executing something else despite knowing what to do by synchronizing understanding and physical movements with verbalizations.
For clearances involving runways, “Hold short of runway,” “Line up and wait,” or “Cross runway”, pilot must use “Verbal Verification” prior to entering the runway to confirm correct reception of the clearance.

For single pilot operations



1 Controller's instructions

The controller uses standard phraseology. If the controller uses plain language, the controller is required to communicate with accuracy and clarity.

2 Pilot's accurate listening and understanding

Since only one pilot is listening, that pilot is solely responsible for discerning the instructions. A pilot should immediately request retransmission from ATC in case of uncertainty.

3 Readback by pilot

The pilot reads back the instructions as he or she understands them. Safety-critical ATC instructions—such as for takeoff, landing, runway crossing, taxiing on runway, holding on runway and holding short of runway—must be read back in full, not just responding with "Roger" or "Wilco."

4 Hearback by controller

The controller listens to the pilot's readback to ascertain that the clearance or instruction has been correctly acknowledged by the pilot and shall take immediate action to correct any discrepancies or omissions revealed by the readback or request "Say again" of the crucial information. This action by the controller is extremely important for single pilot operations.

5 Callouts by pilot

Cross-checking or verbal verification is not necessary in the absence of a second pilot. If the controller does not intervene upon completion of step 1 to 4, it is assumed that the pilot readback is correct. Still, callout is effective for the pilot to help check the pilot's own understanding of the given instructions or clearances following readbacks, resetting the FMS to the assigned clearance, or executing instructions or clearances.

For dual pilot operations, the following points are important:
・**In Step 2-1, both PF and PM independently monitor and understand the instructions without discussion amongst each other.**
・**In Step 3-2, the PF properly monitors the PM's readback.**
Communication errors will be reduced significantly if these two steps are executed consistently.

For single pilot operations, the pilot's accurate listening of the ATC instructions is followed by readback, and the controller's active and intensive hearback become crucial as the communication loop consists of only one pilot and one controller.

3 . Importance of readback and hearback in the communication loop

Readback is a function in ATC communication process essential to prevent "mishearing" and "missing" instructions. Pilots perform readbacks as a standard practice in radio communications, but readback alone does not guarantee pilot misunderstanding of the ATC instruction will be prevented.

For readback to achieve its intended effect, it requires “hearback” where the controller listens and compares what was read back with the message transmitted to ensure the pilot has the correct information. Without proper hearback, readback loses its meaning and value.

Under dual pilot operations, provided closed-loop communication is sustained, hearback will be conducted consistently by PF in the cockpit, and the role of PF's hearback is just as vital as the controller hearback.

There is one situation where a hearback by PF does not work as a safeguard. That is when both PF and PM collectively misunderstood instructions. The only safeguard in such a case is the hearback by controller.

However, the case study analysis identified some cases of runway incursions where controller hearback was not performed consistently, namely, absence of correction or failure to request re-readback of the critical portion of the transmission following incomplete readback, which was a trigger for the subsequent runway incursion. Hearback errors occurred for various reasons, but the primary contributing factors in these case studies were high workload and divided attention. In theory, when the controller finishes the instruction, the pilot will read them back. In return, the controller actively listens to the readback to verify that the contents of the original instructions were properly received and understood by the intended pilot. But in reality, controller’s attention was switched to the other aircraft and instructions. Since controllers must handle multitasks, giving undivided attention to hear back can be challenging sometimes.

In the next section, we discuss radio communication techniques which help avoid misunderstandings and ensure hearback between controller and pilot.

4 .Four tips to avoid misleading instructions and ensure hearback
(For controllers)

☐ When giving instructions or information, it is crucial to consider how your words will be perceived by the pilot. Be mindful of phrases that may result in misunderstanding.

- Sometimes using correct phraseology is not enough. If you are concerned about being misunderstood by the pilot, tailor your message by omitting excessive information or emphasizing critical parts to ensure clarity.

☐ Anticipate when and what kind of instruction the pilot is expecting.

- Instructions should be timed to resonate with pilot. This will increase chances of an accurate readback/hearback process.
- To ensure effective hearback, recognize the potential risk for readback errors if an instruction is potentially unexpected.

☐ Issue important instructions in short easily understandable segments.

- Giving multiple instructions in a single transmission increases the risk of mishearing, so important instructions should be given in segments.

☐ Critical information contained in the transmission should be recognized as "keyword"

- Emphasizing keywords helps to highlight critical instruction (instruction that if compromised, could lead to seriously negative consequences) in addition to aiding accurate delivery of intended meaning to the pilot. As a result, misunderstandings and errors will be mitigated.
- For example, when more than one aircraft is expecting the same instruction, the aircraft call sign becomes the keyword.
- When aircraft with similar call signs are operating on the same frequency, special care must be taken to avoid misidentification by emphasizing key differences to ensure clarity. (e.g.) ABC133 ABC113
- Make a conscious effort to pay attention to the "keywords" when confirming correct readback of the "keywords"

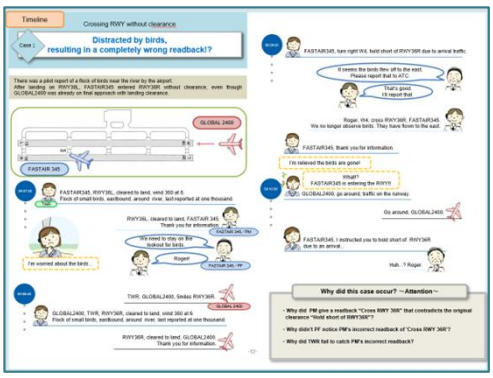
Minimizing communication errors is vital in the effort to reduce runway incursions.
To achieve this goal, **the controller must ensure instructions or clearances will not result in pilot misunderstanding by performing effective hearback**.

Case Studies

The cases in this section were based on past runway incursions representative of situations that could happen to anyone. The primary goal of this section is not to assign blame, but rather to determine probable causes and contributing factors in order to prevent future incidents from occurring. Therefore, identifying information regarding airport, airline and aircraft call sign will be omitted.

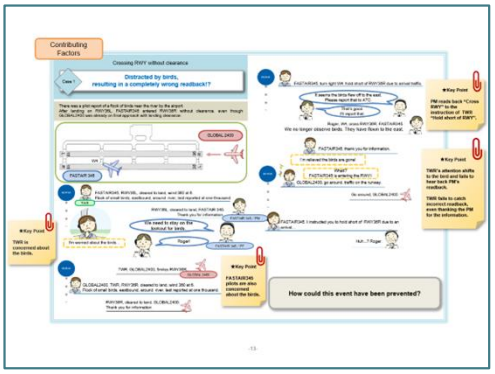
Recommendations

The following case studies can effectively support both individual and group learning. Print out this section for use as a worksheet.



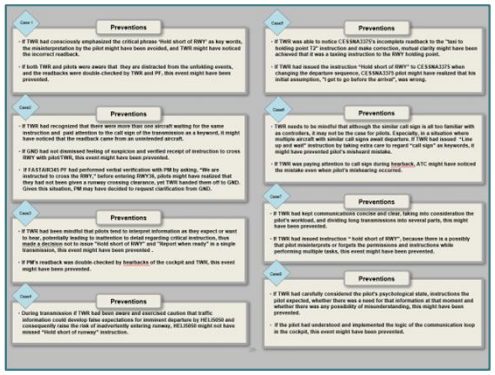
Timeline

Study the graphical depiction of the incidents and radio communication narratives between controller and pilot to grasp an overview of the incident. Then, identify the probable cause. Mark what you think are important points. (In group learning, ensure each participant conducts his or her own analysis)



Contributing Factors

Based on the remarks in this section as well as the key points you identified in the previous section, think about what should have been done differently to prevent this incident. Write down the findings. (In group learning, pose this question in discussion)



Preventive measures

For your reference, we provide examples of alternative actions that could have been taken to prevent the runway incursions at the end of this section (p.28).

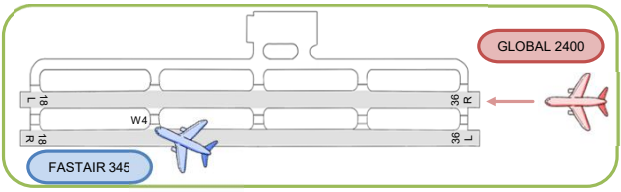
Timeline

Crossing RWY without clearance

Case 1

Distracted by birds, resulting in a completely wrong readback!?

There was a pilot report of a flock of birds near the river by the airport.
After landing on RWY36L, FASTAIR345 entered RWY36R without clearance, even though GLOBAL2400 was already on final approach with landing clearance.



09:07:20

TWR

FASTAIR345, RWY36L, cleared to land, wind 360 at 6.
Flock of small birds, eastbound, around river, last reported at one thousand.

I'm worried about the birds...

RWY36L, cleared to land, FASTAIR 345.
Thank you for information.

FASTAIR345／PM

We need to stay on the lookout for birds.

Roger!

FASTAIR345／PF

09:08:40

TWR, GLOBAL2400, 5miles RWY36R.

GLOBAL 2400

GLOBAL2400, TWR, RWY36R, cleared to land, wind 360 at 6.
Flock of small birds, eastbound, around river, last reported at one thousand.

RWY36R, cleared to land, GLOBAL2400.
Thank you for information.

09:09:30

FASTAIR345, turn right W4, hold short of RWY36R due to arrival traffic.

It seems the birds flew off to the east.
Please report that to ATC.

That's good.
I'll report that.

Roger, W4, cross RWY36R, FASTAIR345.
We no longer observe birds. They have flown to the east.

FASTAIR345, thank you for information.

I'm relieved the birds are gone!

09:10:30

What!?
FASTAIR345 is entering the RWY!!

GLOBAL2400, go around, traffic on the runway.

Go around, GLOBAL2400.

FASTAIR345, I instructed you to hold short of RWY36R due to an arrival...

Huh...? Roger.

Why did this case occur? ～Attention～

- **Why did PM give a readback "Cross RWY 36R" that contradicts the original clearance "Hold short of RWY36R"?**
- **Why did PF fail to notice PM's incorrect readback of 'Cross RWY 36R'?**
- **Why did TWR fail to catch PM's incorrect readback?**

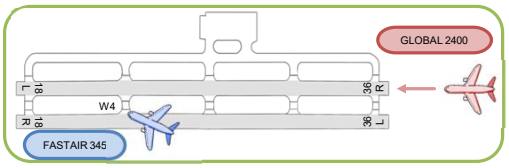
Contributing Factors

Crossing RWY without clearance

Case 1

Distracted by birds, resulting in a completely wrong readback!?

There was a pilot report of a flock of birds near the river by the airport.
After landing on RWY36L, FASTAIR345 entered RWY36R without clearance, even though GLOBAL2400 was already on final approach with landing clearance.



09:07:20

TWR: FASTAIR345, RWY36L, cleared to land, wind 360 at 6.
Flock of small birds, eastbound, around river, last reported at one thousand.

I'm worried about the birds...

RWY36L, cleared to land, FASTAIR 345.
Thank you for information.

FASTAIR 345／PM: We need to stay on the lookout for birds.

FASTAIR 345／PF: Roger!

★Key Point

TWR is concerned about the birds.

★Key Point

FASTAIR345 pilots are also concerned about the birds.

09:08:40

TWR, GLOBAL2400, 5miles RWY36R.

GLOBAL2400, TWR, RWY36R, cleared to land, wind 360 at 6.
Flock of small birds, eastbound, around river, last reported at one thousand.

RWY36R, cleared to land, GLOBAL2400.
Thank you for information.

09:09:30

FASTAIR345, turn right W4, hold short of RWY36R due to arrival traffic.

It seems the birds flew off to the east.
Please report that to ATC.

That's good.
I'll report that.

Roger, W4, cross RWY36R, FASTAIR345.
We no longer observe birds. They have flown to the east.

★Key Point

PM reads back "Cross RWY" to the instruction of TWR "Hold short of RWY".

FASTAIR345, thank you for information.

I'm relieved the birds are gone!

09:10:30

What!?

FASTAIR345 is entering the RWY!!

GLOBAL2400, go around, traffic on the runway.

Go around, GLOBAL2400.

FASTAIR345, I instructed you to hold short of RWY36R due to an arrival,...

Huh...? Roger.

★Key Point

TWR's attention shifts to the bird and fails to hear back PM's readback.

TWR fails to catch incorrect readback, even thanking the PM for the information.

How could this incident have been prevented?

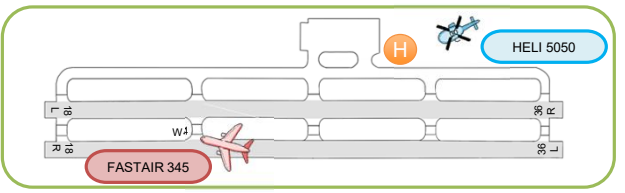
Timeline

Crossing RWY without clearance

Case 2

At that timing!?
I assumed it was directed at me...

After landing on RWY36L, FASTAIR345 entered RWY36R without clearance.



05:07:20

TWR: HELI 5050, cleared to land at East helipad, wind 360 at 6.

Cleared to land at East helipad, HELI 5050. — HELI 5050

FASTAIR345, RWY36L, cleared to land, wind 360 at 5.

RWY36L, cleared to land, FASTAIR345. — FASTAIR345／PM

05:08:40

HELI 5050, contact GND118.1.

I handed HELI 5050 off to GND!

Roger — FASTAIR345／PF

Contact GND.

Contact GND118.1, FASTAIR345.

05:09:00

GND, FASTAIR345, on W4.

FASTAIR345, GND, taxi to spot12.

Taxi to spot12, FASTAIR345.

Is TWR handing FASTAIR345 off already?
TWR must have issued clearance to cross RWY36R.

What!?
FASTAIR345 is Crossing RWY!!

TWR checked with GND about the status of FASTAIR345.

05:09:30

FASTAIR345, have you received the clearance from TWR to cross RWY36R?

Huh?
Haven't we received taxi instruction to the spot?

I thought we have already received it...

Um... we got the clearance, didn't we?

Why did this case occur?～Attention～

- **Why did FASTAIR 345 pilots mistake another aircraft's clearance as their own?**
- **Why didn't the TWR notice that the readback came from an unintended aircraft?**

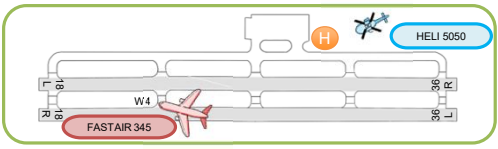
Contributing Factors

Crossing RWY without clearance

Case 2

At that timing!?
I assumed it was directed at me...

After landing on RWY36L, FASTAIR345 entered RWY36R without clearance



05:07:20 TWR: HELI 5050, cleared to land at East helipad, wind 360 at 6.

HELI 5050: Cleared to land at East helipad, HELI 5050.

FASTAIR345: FASTAIR345, RWY36L, cleared to land, wind 360 at 5.

FASTAIR345/PM: RWY36L, cleared to land, FASTAIR345.

05:08:40 TWR: HELI 5050, contact GND118.1.

TWR: I handed HELI 5050 off to GND!

FASTAIR345/PF: Roger

FASTAIR345/PF: Contact GND.

FASTAIR345: Contact GND118.1, FASTAIR345.

★Key Point

TWR is unaware that the readback is from a wrong aircraft.

★Key Point

FASTAIR 345 pilots mistake another aircraft's clearance for their own and are reading back.

★Key Point

GND feels something is wrong but assumes that TWR has given clearance to cross the RWY but doesn't confirm with TWR.

05:09:00 GND: Is TWR handing FASTAIR345 off already? TWR must have issued clearance to cross RWY36R..

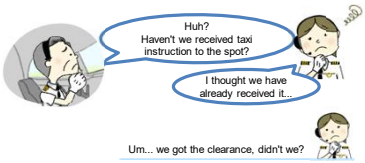
FASTAIR345: GND, FASTAIR345, on W4.

GND: FASTAIR345, GND, taxi to spot12.

FASTAIR345: Taxi to spot12, FASTAIR345.

TWR checked with GND about the status of FASTAIR345.

05:09:30 TWR: FASTAIR345, have you received the clearance from TWR to cross RWY36R?



How could this incident have been prevented?

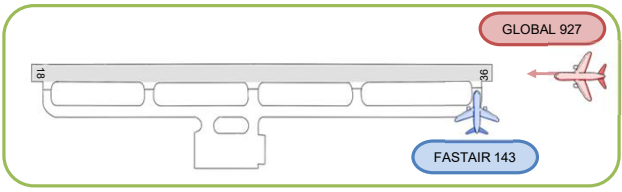
Timeline

Entering RWY
despite receiving “Hold short of RWY” instruction

Case 3

Then don't ask “Ready?”

FASTAIR143 entered RWY without clearance while GLOBAL927 was on final approach.



12:38:47

GLOBAL927, RWY36, continue approach, wind 360 at 6.

Continue approach, GLOBAL927.

12:40:44

I'm going to have the arrival land first before the departure.

FASTAIR143, hold short of RWY36, report when ready.

We are ready, FASTAIR143.

FASTAIR143, roger.
Expect departure after arrival 5 miles on final.

TWR told me to report ready and knows we're "Ready". TWR will clear us for takeoff soon...

12:40:58

Say again, FASTAIR143.

FASTAIR143, hold short of RWY36.

12:41:09

It's too late, FASTAIR143, we are entering runway.

What!?
It's too late to be instructed “Hold short of RWY” now..

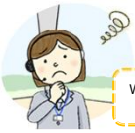
12:41:15

GLOBAL927, go around.

Go around, GLOBAL927.

FASTAIR143, hold position.

Hold position, FASTAIR143.



Why did the pilot enter the runway when I instructed to hold short of runway?

Why did this case occur?～Attention～

- **Why didn't the pilot of FASTAIR143 read back 'Hold short of RWY'?**
- **Why was TWR intention misunderstood by FASTAIR143 pilot which led to an unintended deviation?**

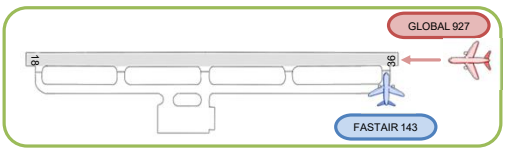
Contributing Factors

Entering RWY
despite receiving "Hold Short of RWY" instruction

Case 3

Then don't ask "Ready?"

FASTAIR143 entered RWY without clearance while GLOBAL927 was on final approach



2:38:47 TWR: GLOBAL927, RWY36, continue approach, wind 360 at 6.

GLOBAL 927: Continue approach, GLOBAL927.

★Key Point

TWR is giving multiple instructions "Hold short of RWY" and "Report when ready" in one transmission.

12:40:44 FASTAIR 143／PM: I'm going to have the arrival land first before the departure

TWR: FASTAIR143, hold short of RWY36, report when ready.

★Key Point

PM doesn't read back "Hold short of RWY."

FASTAIR 143／PM: We are ready, FASTAIR143.

TWR: FASTAIR143, roger.
Expect departure after arrival 5 miles on final.

★Key Point

TWR fails to hear back PM's readback. TWR acknowledges PM's report with "Roger" and provides traffic information.

FASTAIR 143／PF: TWR told me to report ready and knows we're "Ready". TWR will clear us for takeoff soon...

12:40:58 TWR: FASTAIR143, hold short of RWY36.

FASTAIR 143／PF: Say again, FASTAIR143.

12:41:09 FASTAIR 143／PF: It's too late, FASTAIR143, we are entering runway.

FASTAIR 143／PM: What!?
It's too late to be instructed "Hold short of RWY" now..

12:41:15 TWR: GLOBAL927, go around.

GLOBAL 927: Go around, GLOBAL927.

TWR: FASTAIR143, hold position.

FASTAIR 143／PM: Hold position, FASTAIR143.

Why did the pilot enter the runway when I instructed to hold short of runway?

How could this incident have been prevented?

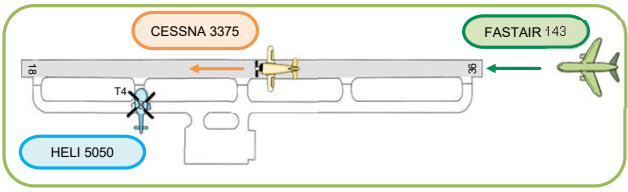
Timeline

Entering RWY
despite receiving “Hold short of RWY” instruction

Case 4

I think I’ll be first...

HELI 5050 entered RWY without clearance while FASTAIR143 was on final approach.



09:46:02

TWR: CESSNA3375, RWY36, cleared touch and go, wind 360 at 6.

CESSNA 3375: Cleared touch and go, CESSNA3375.

09:48:25

HELI 5050: TWR, HELI 5050, approaching T4.

TWR: HELI 5050, TWR, hold short of RWY36, CESSNA on the runway.

I’ll have HELI 5050 depart after CESSNA3375!

TWR: HELI 5050, hold short of RWY36.

TWR will clear me for takeoff after CESSNA3375.

09:48:40

FASTAIR 143: FASTAIR143, 5miles on final.

TWR: FASTAIR143, TWR, RWY36, continue approach.

FASTAIR 143: Continue approach, FASTAIR143.

09:49:10

TWR: HELI 5050, hold short of RWY36, B737 4miles on final.

FASTAIR143 is coming fast...
I’ll have HELI 5050 depart after FASTAIR143.

TWR: Hold short of RWY36, HELI 5050.

B737 is in sight.
I need to depart quickly!

What!? HELI 5050 is entering the RWY!

09:49:34

TWR: FASTAIR143, go around, traffic on the runway.

TWR: Go around, FASTAIR143.

HELI 5050: HELI 5050, hold position.

HELI 5050: Hold position, HELI 5050.

Why did this case occur?～Attention～

- **Why did the HELI5050 pilot enter the RWY despite correct readback to “Hold short of RWY” instruction?**
- **Why wasn’t TWR’s intention accurately conveyed to the HELI5050 pilot?**

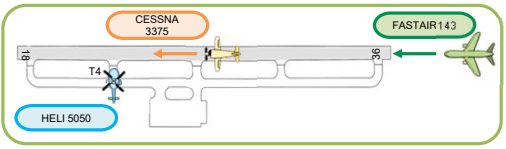
Contributing Factors

Entering RWY
despite receiving "Hold short of RWY" instruction

Case 4

I think I'll be first...

HELI 5050 entered the runway without clearance while FASTAIR143 was on final approach.



09:46:02 TWR: CESSNA3375, RWY36, cleared touch and go, wind 360 at 6.

CESSNA 3375: Cleared touch and go, CESSNA3375.

09:48:25 HELI 5050: TWR, HELI 5050, approaching T4.

TWR: HELI 5050, TWR, hold short of RWY36, CESSNA on the runway.

HELI 5050: I'll have HELI 5050 depart after CESSNA3375!

HELI 5050: HELI 5050, hold short of RWY36.

TWR: TWR will clear me for takeoff after CESSNA3375.

★Key Point

TWR is planning to have HELI 5050 depart after CESSNA 3375.

★Key Point

HELI 5050 pilot believes that he will depart after CESSNA3375.

09:48:40 FASTAIR143: FASTAIR143, 5miles on final.

FASTAIR143, TWR, RWY36, continue approach.

TWR: Continue approach, FASTAIR143.

09:49:10 HELI 5050: HELI 5050, hold short of RWY36, B737 4miles on final.

HELI 5050: FASTAIR143 is coming fast... I'll have HELI 5050 depart after FASTAIR143.

TWR: Hold short of RWY36, HELI 5050.

HELI 5050: B737 is in sight. I need to depart quickly!

★Key Point

TWR changes the sequence that HELI 5050 will be after FASTAIR143.

★Key Point

HELI5050 pilot is wrongly assuming that he will be given takeoff clearance at any minute even after sighting FASTAIR143 on final.

What!? HELI 5050 is entering the RWY!

09:49:34 TWR: FASTAIR143, go around, traffic on the runway.

FASTAIR143: Go around, FASTAIR143.

HELI 5050: HELI 5050, hold position.

TWR: Hold position, HELI 5050.

How could this incident have been prevented?

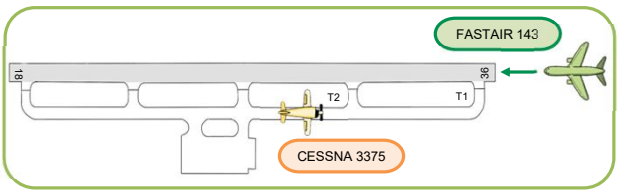
Timeline

Entering RWY without clearance

Case 5

Haven't been instructed to "hold short of RWY", so I entered the RWY

CESSNA3375 entered the RWY without clearance while FASTAIR143 was making low approach.



12:52:20

CESSNA3375, request taxi, right turn departure.

CESSNA 3375

TWR

CESSNA3375, right turn, roger.
Do you accept T2 intersection departure due to arrival?

I want to have CESSNA3375 depart before FASTAIR143, so I'll have CESSNA3375 taxi to T2.

Accept, CESSNA3375.

I get to depart first. I'd better hurry...

CESSNA3375, taxi to holding point T2, RWY36.

That's good to hear!

Taxi to holding point RWY36, CESSNA3375.

TWR, FASTAIR143, 12miles on final for low approach, after low approach, follow missed approach procedure, climb 3,500.

FASTAIR 143

FASTAIR143 TWR, RWY36, continue approach, expect one departure CESSNA172.

RWY36, continue approach, FASTAIR143.

Um, where's T2?

Wait! I instructed CESSNA3375 to taxi to T2, but it is heading toward T1...
I'm not going to re-clearance becauseT1 will work as well. But the pilot seems disoriented. To be on the safe side, I'll change the sequencing of landing and take off, giving priority to FASTAIR143.

FASTAIR143, no departure this time, RWY36, cleared low approach, wind 360 at 7.

Cleared low approach, FASTAIR143.

What!? CESSNA3375 is entering the RWY!!

12:54:20

FASTAIR143, go around, traffic on the runway.

Go around, FASTAIR143.

CESSNA3375, hold position.

Hold position..... CESSNA3375…

Wait, where am I right now?

Why did this case occur?~Attention~

- **Why did CESSNA3375 pilot enter the RWY without clearance from TWR?**
- **Why was TWR intention misunderstood by the pilot which led to an unintended deviation?**

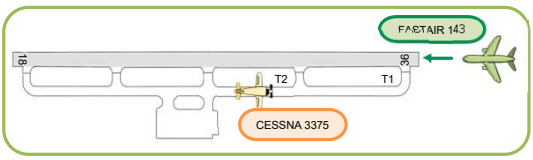
Contributing Factors

Entering RWY without clearance

Case 5

Haven't been instructed to "hold short of RWY", so I entered the RWY

CESSNA3375 entered the RWY without clearance while FASTAIR143 was on a low approach.



12 52 20

CESSNA3375, request taxi, right turn departure.

CESSNA 3375

TWR

CESSNA3375, right turn, roger.
Do you accept T2 intersection departure due to arrival?

Accept, CESSNA3375.

I want to have CESSNA3375 depart before FASTAIR143, so I'll have CESSNA3375 taxi to T2.

I get to depart first. I'd better hurry...

★Key Point

CESSNA3375 pilot is in a hurry because he thinks he must depart before the arriving aircraft.

CESSNA3375, taxi to holding point T2, RWY36.

That's good to hear!

Taxi to holding point RWY36, CESSNA3375.

TWR, FASTAIR143, 12miles on final for low approach, after low approach, follow missed approach procedure, climb 3,500.

FASTAIR 143

FASTAIR143 TWR, RWY36, continue approach, expect one departure CESSNA172.

RWY36, continue approach, FASTAIR143.

★Key Point

TWR fails to hear back PM's readback.

Um, where's T2?

Wait! I instructed CESSNA3375 to taxi to T2, but it is heading toward T1...
I'm not going to re-clearance becauseT1 will work as well. But the pilot seems disoriented. To be on the safe side, I'll change the sequencing of landing and take off, giving priority to FASTAIR143.

★Key Point

CESSNA375 5 pilot is unfamiliar with the airport and has lost his directions.

★Key Point

TWR doesn't take any actions regarding CESSNA3375.

FASTAIR143, no departure this time, RWY36, cleared low approach, wind 360 at 7.

Cleared low approach, FASTAIR143.

What!? CESSNA3375 is entering the RWY!!

12 54 20

FASTAIR143, go around, traffic on the runway.

Go around, FASTAIR143.

CESSNA3375, hold position.

Hold position..... CESSNA3375...

Wait, where am I right now?

How could this incident have been prevented?

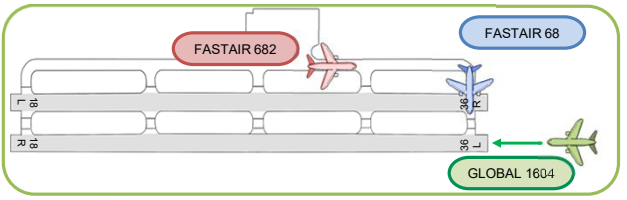
Timeline

Mistakenly entering RWY due to similar call signs

Case 6

I thought it was my turn...

FASTAIR68 entered the RWY without permission where GLOBAL1604 was approaching with landing clearance.



10:15:40

TWR: FASTAIR68, cross RWY36R, hold short of RWY36L.

FASTAIR68, cross RWY36R, hold short of RWY36L. (FASTAIR 68／PM)

10:16:10

GLOBAL1604, RWY36L, continue approach due to departure.

I'll have FASTAIR68 depart first!

RWY36L, continue approach, GLOBAL1604. (GLOBAL 1604)

10:18:20

TWR, FASTAIR682 with you. (FASTAIR 682)

FASTAIR682, TWR, hold short of RWY36R.

GLOBAL1604 is faster than I thought.
I will change the sequence of departures and have FASTAIR 682 depart first!

Hold short of RWY36R, FASTAIR682

10:19:30

GLOBAL1604,
RWY36L, cleared to land, wind 360 at 5.

RWY36L, cleared to land, GLOBAL1604.

I guess it's about our turn.

Yes, it is. (FASTAIR 68／PF)

10:19:53

FASTAIR682, RWY36R, line up and wait.

RWY36L, line up and wait, FASTAIR68.

We got "Line up and wait," right?

Yes, we did.

10:20:00

TWR, FASTAIR682, confirm line up and wait, RWY36R.

FASTAIR682, affirm, RWY36R, line up and wait.

10:20:10

Why did the pilot confirm it?

FASTAIR682, RWY36R, line up and wait.

10:20:30

What!?
FASTAIR68 is entering the RWY!!

GLOBAL1604, go around, traffic on the runway.

Go around, GLOBAL1604.

FASTAIR68, hold position.

Hold position, FASTAIR68.

Why did this case occur?～Attention～

- **Why did FASTAIR68 pilots mistake another aircraft's clearance for their own?**
- **Why didn't the TWR notice that the readback came from an unintended aircraft?**

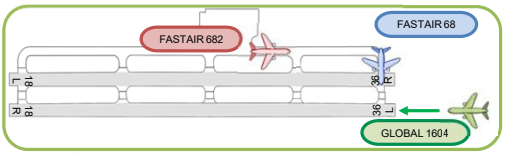
Contributing Factors

Mistakenly entering RWY due to similar call signs

Case 6

I thought it was my turn...

FASTAIR68 entered the RWY without permission where GLOBAL1604 was approaching with landing clearance.



10:15:40 TWR: FASTAIR68, cross RWY36R, hold short of RWY36L.

FASTAIR68, cross RWY36R, hold short of RWY36L. (FASTAIR 68／PM)

10:16:10 GLOBAL1604, RWY36L, continue approach due to departure.

I'll have FASTAIR68 depart first!

RWY36L, continue approach, GLOBAL1604. (GLOBAL 1604)

★Key Point

TWR is planning to have FASTAIR68 depart before an arrival.

TWR, FASTAIR682 with you. (FASTAIR 682)

10:18:20 FASTAIR682, TWR, hold short of RWY36R.

Hold short of RWY36R, FASTAIR682.

GLOBAL1604 is faster than I thought.
I will change the sequence of departures and have FASTAIR 682 depart first!

★Key Point

TWR changed the sequence of departures. FASTAIR682 will depart first, before the arriving aircraft, and then FASTAIR68 will depart.

10:19:30 GLOBAL1604, RWY36L, cleared to land, wind 360 at 5.

RWY36L, cleared to land, GLOBAL1604.

★Key Point

FASTAIR68 pilots are expecting to depart shortly.

I guess it's about our turn.

Yes, it is. (FASTAIR 68／PF)

10:19:53 FASTAIR682, RWY36R, line up and wait.

RWY36L, line up and wait, FASTAIR68.

We got "Line up and wait," right?

Yes, we did.

★Key Point

TWR fails to hear back PM's readback.

10:20:00 TWR, FASTAIR682, confirm line up and wait, RWY36R.

0:20:10 FASTAIR682, affirm, RWY36R, line up and wait.

Why did the pilot confirm it?

FASTAIR682, RWY36R, line up and wait.

★Key Point

TWR felt something was wrong but did not take any action.

10:20:30 What!? FASTAIR68 is entering the RWY!!

GLOBAL1604, go around, traffic on the runway.

Go around, GLOBAL1604.

FASTAIR68, hold position.

Hold position, FASTAIR68.

How could this incident have been prevented?

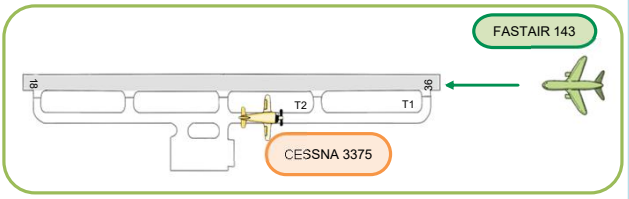
Timeline

Entering RWY
while distracted by radio communication

Case 7

Is that really something to ask while taxiing...?

CESSNA3375 on training entered the RWY without clearance while FASTAIR143 was on final approach with landing clearance.



13:50:00

TWR, CESSNA3375.

CESSNA 3375

CESSNA3375, TWR, go ahead.

TWR

CESSNA3375, spot 4, right turn departure, proceed to YAMATO climb to 1,500. Request taxi and departure instruction.

CESSNA3375, taxi to holding point T1, RWY36.

Request T2 intersection departure, CESSNA3375.

CESSNA3375, T2 intersection approved, taxi to holding point T2.

Taxi to holding point T2, CESSNA3375.

13:51:10

FASTAIR143, RWY36, cleared to land, wind 360 at 5.

RWY36, cleared to land, FASTAIR143.

FASTAIR 143

What altitude would the pilot maintain after YAMATO?

Ceiling is low... Is he planning an IFR pickup?

15:51:56

CESSNA3375, request intention after YAMATO.

Climb to 7,500 around YAMATO, CESSNA3375.

CESSNA3375, roger.

CESSNA3375, you're going to request IFR pickup around NIHON?

Checklist in progress

Sorry, say again, CESSNA3375.

CESSNA3375, ah..I'd like to confirm that now the cloud base is at 3,500ft, and you plan to climb to 7,500ft. Is that correct?

Yes, I intend to stay clear of clouds during climb. And, to climb higher, intention change. Request straight out departure.

Ceiling is low, so I'll avoid clouds.

CESSNA3375, roger.

13:53:10

Ah!? CESSNA3375 is entering the RWY!!

FASTAIR143, go around, traffic on the runway.

Go around, FASTAIR143.

CESSNA3375, hold present position.

Hold present position, CESSNA3375.

CESSNA3375, I didn't issue the clearance to enter the RWY.

Why did this case occur?～Attention～

- **Why did CESSNA3375 pilot enter the RWY without clearance from TWR?**
- **Why was TWR intention misunderstood by the pilot which led to an unintended deviation?**

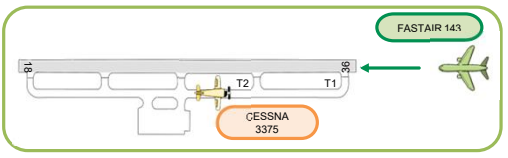
Contributing Factors

Entering RWY
while distracted by radio communication

Case 7

Is that really something to ask while taxiing...?

CESSNA3375 on training entered the RWY without clearance while FASTAIR143 was on final approach with landing clearance.



13:50:00

TWR

CESSNA3375, TWR, go ahead.

TWR, CESSNA3375.

CESSNA 3375

CESSNA3375, spot 4, right turn departure, proceed to YAMATO climb to 1,500. Request taxi and departure instruction.

CESSNA3375, taxi to holding point T1, RWY36.

Request T2 intersection departure, CESSNA3375.

CESSNA3375, T2 intersection approved, taxi to holding point T2.

Taxi to holding point T2, CESSNA3375.

13:51:10

FASTAIR143, RWY36, cleared to land, wind 360 at 5.

RWY36, cleared to land, FASTAIR143.

FASTAIR 143

★Key Point

TWR is concerned about CESSNA3375's request for VFR clearance due to weather conditions (low cloud base).

What altitude would the pilot maintain after YAMATO?

Ceiling is low... Is he planning an IFR pickup?

15:51:56

CESSNA3375, request intention after YAMATO.

Climb to 7,500 around YAMATO, CESSNA3375.

CESSNA3375, roger.

CESSNA3375, you're going to request IFR pickup around NIHON?

★Key Point

Pilot, operating alone, goes through the pre-takeoff checklist during taxi.

Checklist in progress

Sorry, say again, CESSNA3375.

CESSNA3375, ah..I'd like to confirm that now the cloud base is at 3,500ft, and you plan to climb to 7,500ft. Is that correct?

Yes, I intend to stay clear of clouds during climb. And, to climb higher, intention change. Request straight out departure.

Ceiling is low, so I'll avoid clouds.

CESSNA3375, roger.

★Key Point

TWR is confirming the altitude with the pilot.

13:53:10

Ah!? CESSNA3375 is entering the RWY!!

FASTAIR143, go around, traffic on the runway.

Go around, FASTAIR143.

CESSNA3375, hold present position.

Hold present position, CESSNA3375.

CESSNA3375, , I didn't issue the clearance to enter the RWY.

How could this incident have been prevented?

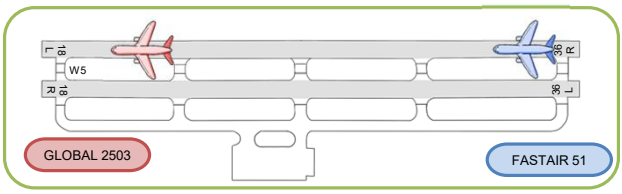
Timeline

Beginning takeoff roll without clearance

Case 8

I meant well when I said that...

Under low visibility, FASTAIR51 began takeoff roll without clearance while the preceding arrival, GLOBAL2503, was still on the RWY.



10:28:41

TWR: FASTAIR51, RWY36R, line up and wait, RWY36R RVR touchdown 750m.

FASTAIR51／PM: RWY36R, line up and wait, FASTAIR51.

10:29:18

GLOBAL2503, turn left W5, cross RWY36L.

GLOBAL2503: GLOBAL2503, W5, cross RWY36L.

FASTAIR51／PF: It's about time for our departure....

(※)holdover time

Duration of effectiveness of deicing/anti-icing fluid

What are they doing... I'm worried about holdover time(※).

It's good until 33 minutes, so we've still got 2–3 minutes!

Next arrival is coming soon.

10:30:40

FASTAIR51, expect immediate departure, arrival traffic 6 miles.

Roger, FASTAIR51.

Take-off

Roger

Ah! FASTAIR51 is rolling!!

10:30:59

FASTAIR51, stop immediately, FASTAIR51, stop immediately.

FASTAIR51.

I'm glad the pilot was able to bring the aircraft to a stop. If he was unable to stop, it would have been a disaster. Apply the lessons from the Tenerife.

Why did this case occur?～Attention～

- **Why did the pilot of FASTAIR51 start a takeoff roll?**
- **Why wasn't TWR intention clearly communicated to the pilot?**

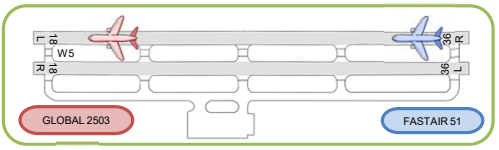
Contributing Factors

Beginning takeoff roll without clearance

Case 8

I meant well when I said that...

Under low visibility, FASTAIR51 began takeoff roll without clearance while the preceding arrival, GLOBAL2503, was still on the RWY.



10:28:41 FASTAIR51, RWY36R, line up and wait, RWY36R RVR touchdown 750m.

TWR

RWY36R, line up and wait, FASTAIR51.

FASTAIR 51／PM

10:29:18 GLOBAL2503, turn left W5, cross RWY36L.

GLOBAL2503, W5, cross RWY36L.

GLOBAL 2503

★Key Point

The PF is waiting for a takeoff clearance.

FASTAIR 51／PF

It's about time for our departure....

(※)holdover time

Duration of effectiveness of deicing/anti-icing fluid

What are they doing... I'm worried about holdover time(※).

It's good until 33 minutes, so we've still got 2–3 minutes!

★Key Point

The PF is worried about holdover time.

★Key Point

TWR informs the pilot of position of succeeding arrival traffic and that it is expected to depart immediately.

Next arrival is coming soon.

★Key Point

The PF is concerned about the next arrival.

10:30:40 FASTAIR51, expect immediate departure, arrival traffic 6 miles.

Roger, FASTAIR51.

Take-off

Roger

★Key Point

FASTAIR51 pilots believe that they got clearance for take-off.

Ah! FASTAIR51 is rolling!!

10:30:59 FASTAIR51, stop immediately, FASTAIR51, stop immediately.

FASTAIR51.

I'm glad the pilot was able to bring the aircraft to a stop. If he was unable to stop, it would have been a disaster. Apply the lessons from the Tenerife.

How could this incident have been prevented?

Case 1

Preventive measures

- If TWR had consciously emphasized the critical phrase 'Hold short of RWY' as key words, the misinterpretation by the pilot might have been avoided, and TWR might have noticed the incorrect readback.
- If both TWR and pilots were aware that they are distracted from the unfolding events, and the readbacks were double-checked by TWR and PF, this event might have been prevented.

Case2

Preventive measures

- If TWR had recognized that there were more than one aircraft waiting for the same instruction and paid attention to the call sign of the transmission as a keyword, it might have noticed that the readback came from an unintended aircraft.
- If GND had not dismissed feeling of suspicion and verified receipt of instruction to cross RWY with pilot/TWR, this event might have been prevented.
- If FASTAIR345 PF had performed verbal verification with PM by asking, "We are instructed to cross the RWY," before entering RWY36, pilots might have realized that they had not been given a runway crossing clearance, yet TWR handed them off to GND. Given this situation, PM may have decided to request clarification from GND.

Case3

Preventive measures

- If TWR had been mindful that pilots tend to interpret information as they expect or want to hear, potentially leading to inattention to detail regarding critical instruction, thus made a decision not to issue "Hold short of RWY" and "Report when ready" in a single transmission, this event might have been prevented .
- If PM's readback was double-checked by cockpit and TWR hearbacks, this event might have been prevented.

Case4

Preventive measures

- During transmission if TWR had been aware and exercised caution that traffic information could develop false expectations for imminent departure by HELI5050 and consequently raise the risk of inadvertently entering runway, HELI5050 might not have missed "Hold short of runway" instruction.

Case5

Preventive measures

- If TWR was able to notice CESSNA3375's incomplete readback to the "taxi to holding point T2" instruction and make correction, mutual clarity might have been achieved that it was a taxiing instruction to the RWY holding point.
- If TWR had issued the instruction "Hold short of RWY" to CESSNA3375 when changing the departure sequence, CESSNA3375 pilot might have realized that his initial assumption, "I get to go before the arrival", was wrong.

Case6

Preventive measures

- TWR needs to be mindful that although the similar call sign is all too familiar with as controllers, it may not be the case for pilots. Especially, in a situation where multiple aircraft with similar call signs await departure. If TWR had issued "Line up and wait" instruction by taking extra care to regard "call sign" as keywords, it might have prevented pilot's misheard mistake.
- If TWR was paying attention to call sign during the hearback, ATC might have noticed the mistake even when pilot's mishearing occurred.

Case7

Preventive measures

- If TWR had kept communications concise and clear, taking into consideration the pilot's workload, and dividing long transmissions into several segments, this might have been prevented.
- Because the pilot is often performing multiple tasks at once, there is a possibility that pilot misinterprets or forgets ATC instructions. Had the TWR issued " hold short of RWY", this incident might have been prevented.

Case8

Preventive measures

- If TWR had carefully considered the pilot's psychological state, instructions the pilot expected, whether there was a need for that information at that moment and whether there was any possibility of misunderstanding, this might have been prevented.
- If the pilot had understood and implemented the logic of the communication loop in the cockpit, this event might have been prevented.

Preventing runway incursions

1 .Key points for controllers

- As a stakeholder in the communication loop, it is essential for controllers to give accurate instructions and conduct effective hearback.
- It is important to anticipate and address a situation when you suspect a pilot might misunderstand your instructions to prevent it from escalating into a runway incursion. You can develop your anticipation skills by predicting the pilot's potential reaction and subsequent consequences as a result of your instructions.
- Recognizing and delivering critical information as "keywords" helps highlight that which is essential information and aids accurate delivery of the intended meaning of your instructions to the pilot.
- When aircraft with similar call signs are operating on the same frequency, special care must be taken to avoid misidentification by specifying the difference to ensure clarity.

- In situations where a pilot is unfamiliar with the airport, under time pressure, or managing multiple tasks simultaneously, misunderstanding or forgetting clearances and instructions may occur. Therefore, the following considerations must be taken:

  - To the maximum extent practicable, do not give information that may lead to misjudgment by the pilot. Instead, issue clear instructions one-by-one and ensure pilot readback to each instruction.

  - Keep communications clear and concise by breaking up lengthy transmissions into chunks and ensuring an accurate hearback.

  - Make an effort to maintain visual contact on the movement of the aircraft you are working. If you feel that the pilot may execute incorrectly, say the instruction again right before the pilot executes the maneuver, even if the instructions were given in advance.

- In theory, readbacks that go unchallenged by the controller's hearback mean that the controller gave an implicit confirmation of the readback. But this could also mean that the controller missed the pilot readback. While it may not be necessary for the controller to again respond to the pilot by saying "Affirm", it is recommended that the controller tell him or herself "Affirm" for self-confirmation. A controller must request a pilot to re-readback when there is an issue with the initial readback of a clearance or instruction. This could be due to an incomplete readback missing important parts of a clearance or instruction, or an inaudible readback.

- If an aircraft is in a position close to or at the runway holding point but cannot enter due to traffic conditions, controllers need to give instructions such as "Hold short of runway."

- If instructions such as “Hold short of runway” are accompanied by additional information that suggests an early departure (e.g. “Report when ready”) there is a risk the pilots may interpret them as permission to proceed onto the runway. Such additional information should be avoided whenever possible to ensure that runway entry clearances or hold instructions are clearly conveyed.

- Providing sequence information to pilot (e.g. "Number one") can be helpful for takeoff preparation, if properly used. But it can also pose a threat by misleading the pilot that the controller is requesting a taxi without delay based on traffic situation. Therefore, the controller needs to think twice about the necessity, effectiveness and psychological impact on the pilot.

- Providing information using the term “expect” may be well-intended by controllers but still pose a risk of misunderstanding for pilots. Therefore, when giving such information, it is essential to consider the timing, aircraft location, and operational situation.

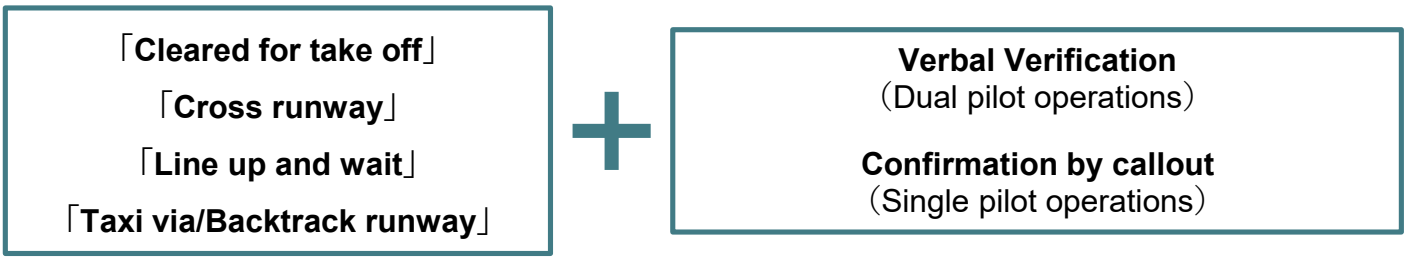
- In the case of irregular events (e.g. bird strikes), attention from both controllers and pilots tends to shift to the events themselves, causing a decline in attention towards essential communication. To avoid this, it is recommended not to combine instructions and event-related information in a single transmission.

- Due consideration should be given to pilots during critical phases of flight such as takeoff and landing, as pilots are required to follow the prescribed tasks to maintain safety in the cockpit.

2 .Key points for pilots

- It is important to understand the communication loop and practice it in every ATC communications, including clearance or instruction.

- Runway incursions cannot happen unless an aircraft enters the runway. They can be prevented if pilots keep in mind that authorization to enter the runway requires one of the following instructions:“Cleared for takeoff”,“Cross runway”, “Line up and wait”or “Taxi via /Backtrack runway”, and make a callout to become aware of this requirement. This will help prevent most instances of the runway incursions.



- Get in the habit of making callouts to confirm the clearance/instruction issued is one of the four requirements for runway entry authorization or "Hold short of runway” every time you approach the runway, so it will become second nature.

- Pilots should bear in mind that you are always instructed to either "Cross runway" or "Hold short of runway" before crossing the runway. This awareness leads to verbal confirmation when you approach the runway.

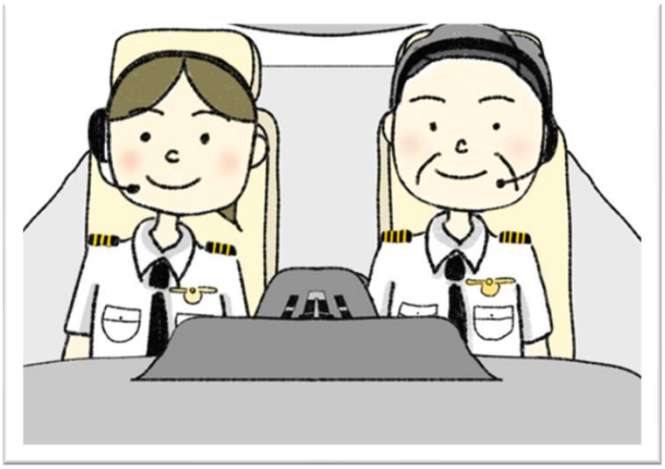
- Pilots should be aware that the instructions concerning runway crossing are always instructed on tower frequency.

- Pilots should monitor and give attention to other aircraft radio communications, anticipate the actions of other aircraft, and identify any existing threats. Under dual pilot operations, once existing threats are identified, that situation awareness must be communicated between PF and PM.

- At an airport where essential information is provided by the flight information officer, the pilot must confirm receipt of a "Runway is clear" message when executing takeoffs and landings.

- To ensure safety of flight, observe sterile cockpit rules※ and not engage in any non-essential activities during critical phases of the flight such as takeoff and landing.

- Accurate listening and readback of the ATC instructions are particularly important in single pilot operations.



※Sterile Cockpit Rule：Except in emergencies or safety-critical situations, communication to the cockpit should be kept to a minimum. When other flight crew or personnel are on board, refrain any actions or unnecessary conversations that could disrupt the pilot's attention or concentration.

3 . Summary of ATC communication

For dual pilot operations

Step 1
・Recognize critical information as "keywords"
・Omit excessive information from instructions
・Issue instructions in a timely manner
・Take precautions against call sign confusion
・Important instructions should be issued one-by-one, without being combined with other instructions.
・Issue appropriate instructions such as "Hold short of runway" when traffic conditions do not allow runway entry.
・Concise and clear communication
etc.

Step 2-1
・Both PF and PM should refrain from verbalizing their understanding.
・Even if the instructions were not clearly heard, do not discuss or confirm them together.
etc.

Step 2-2
・This step is performed solely by PF
etc.

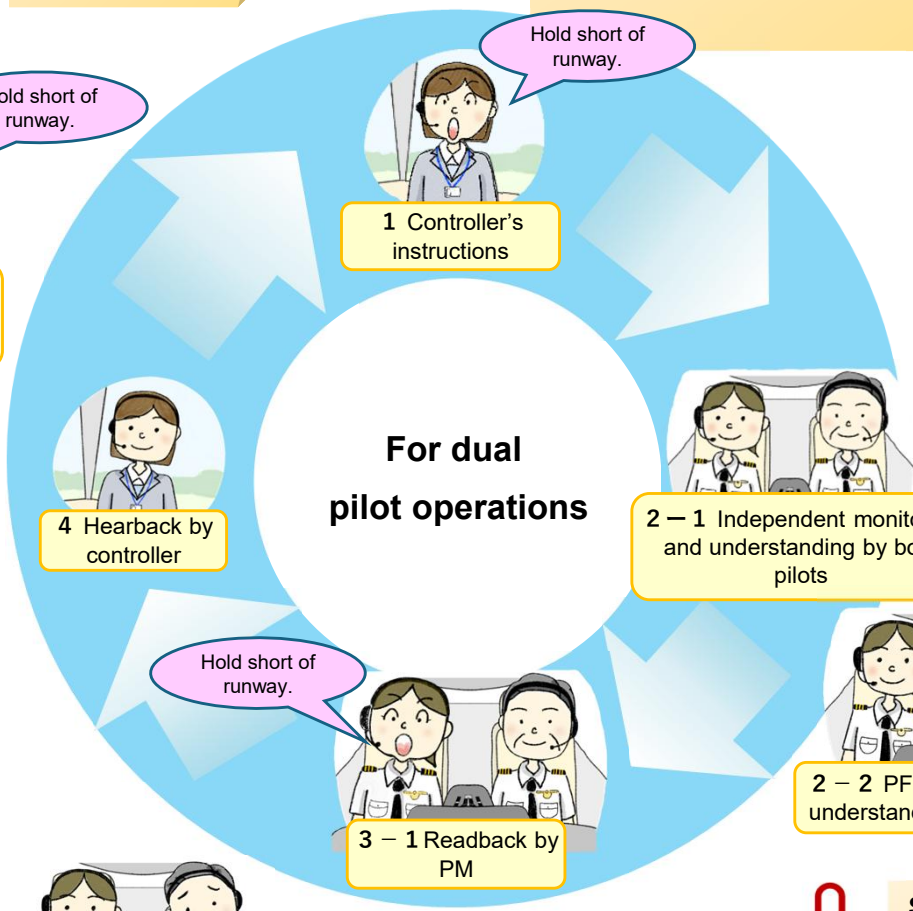
Step 3-1
・This step is performed solely by PM
・Safety-critical ATC instructions must be read back in full, not just responding with “Roger” or “Wilco.”
etc.

Step 3-2
・This step is performed solely by PF
・PF acknowledges the PM's understanding by not saying anything.
etc.

Step 4
・Confirm correct readback of the "keywords"
・If there are any discrepancies or errors in the readback, the controller must immediately correct them, or request re-readback of the crucial information.
etc.

Step 5-1
・Reconfirm receipt of one of the four clearances/instructions which authorizes runway entry.
etc.

Step 5-2
・Perform verbal verification when approaching the runway
etc.



For single pilot operations

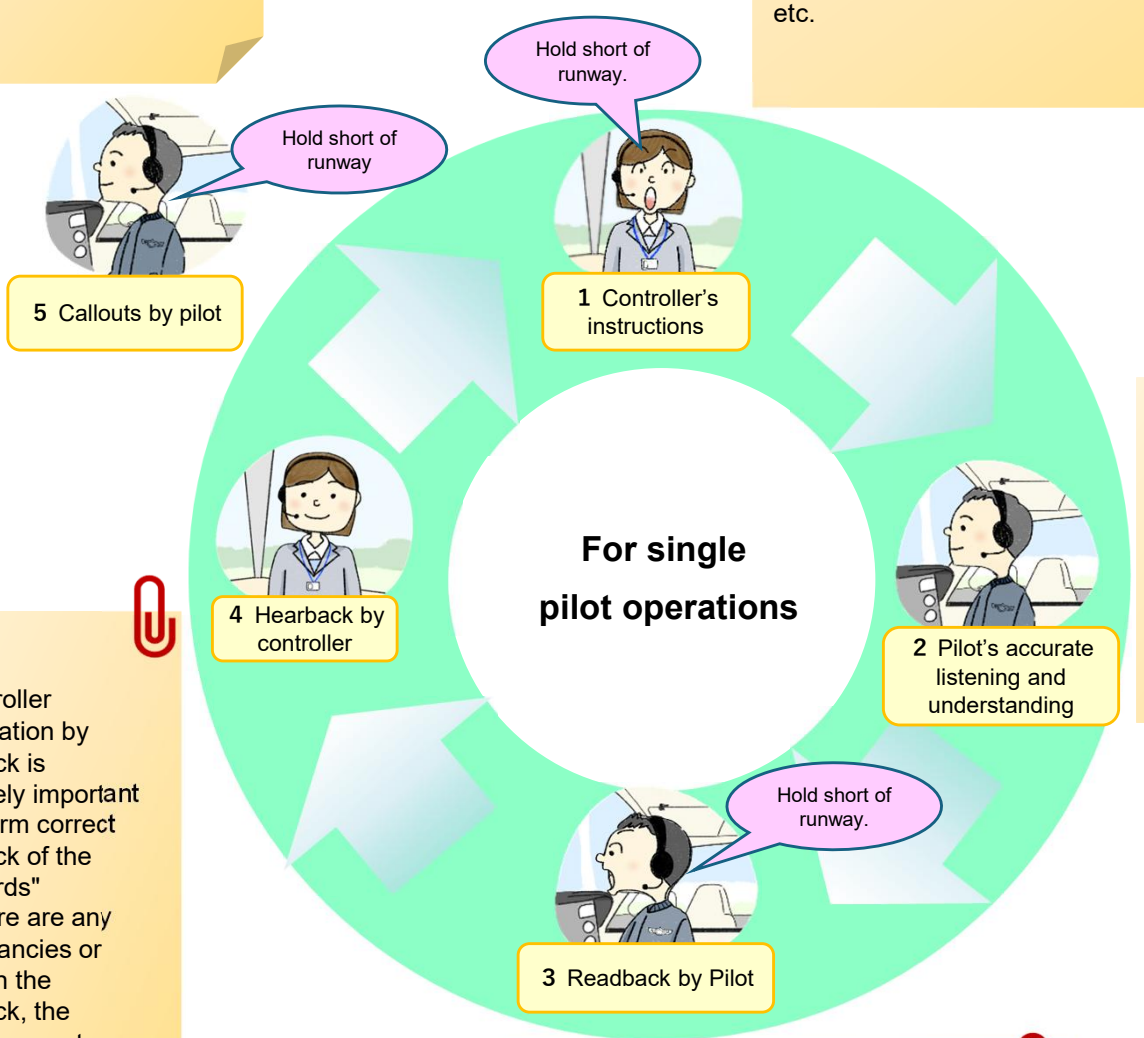
Step 1
・Recognize critical information as "keywords"
・Omit excessive information from transmissions
・Issue instructions in a timely manner
・Take precautions against similar call sign situations
・Issue important instructions in short segments.
・Issue appropriate instructions such as "Hold short of runway" when traffic conditions do not allow runway entry
・Concise and clear communication
etc.

Step 2
・Request clarification or re-transmission immediately if you are uncertain of the instructions.
etc.

Step 3
・Safety-critical ATC instructions must be read back in full, not just responding with “Roger” or “Wilco.”
etc.

Step 4
・Controller confirmation by hearback is extremely important
・Confirm correct readback of the "keywords"
・If there are any discrepancies or errors in the readback, the controller must immediately correct them, or request re-readback of the crucial information.
etc.

Step 5
・Reconfirm receipt of one of the four clearances/instructions which authorizes runway entry.
・Callout to reconfirm the clearance/instructions
etc.



Comparison table of Communication Loop

For dual pilot operations	For single pilot operations
1 Controller's instructions	**1 Controller's instructions**
The controller uses standard phraseology. If the controller uses plain language, the controller is required to communicate with accuracy and clarity.	
2 − 1 Independent monitoring and understanding by both pilots	**2 Pilot's accurate listening and understanding**
Both PF and PM independently monitor and understand the instructions. It is a key point that they neither verbalize what they understand, nor discusses the instructions with each other if ATC instructions are unintelligible. This minimizes the risk of PF and PM reinforcing each other's incorrect conformed assumptions. Independent monitoring also enables the PF to monitor the PM's readback.	Since only one pilot is listening, that pilot is solely responsible for discerning the instructions. A pilot should immediately request retransmission from ATC in case of uncertainty.
2 − 2 PF's reaction to indicate understanding or a lack thereof	
If the PF understands the instruction, the PF acknowledges with "Roger" (or a thumbs-up) to the PM. If the ATC instruction is unclear, the PF says "Say again" and has the PM request the controller to say again. When the PM does not understand the instruction, even if the PF signals understanding, based on the independent monitoring process, the PM must then request the controller to retransmit, saying "Say again intersection" for example, until full understanding is achieved.	
3 − 1 Readback by PM	**3 Readback by Pilot**
After the PF expressed acknowledgement, and the PM also independently achieves understanding of the instruction, the PM reads back the instruction as he or she understood it.	The pilot reads back the instructions as he or she understands them.
Safety-critical ATC instructions—such as for takeoff, landing, runway crossing, taxiing on runway, holding on runway and holding short of runway—must be read back in full, not just responding with "Roger" or "Wilco."	
3 − 2 Hearback by PF	
The PF monitors the PM's readback and if it differs from what the PF has understood, PF immediately says "Confirm" or "Say again" to the PM. This is "hearback in the cockpit," the importance of which that confirmation of the content of the communication is reinforced through hearback in the cockpit instead of relying solely on the controller. If the PF says nothing, it implicitly means that the PM's readback matches PF's understanding.	
4 Hearback by controller	**4 Hearback by controller**
The controller listens to the pilot's readback to ascertain that the clearance or instruction has been correctly acknowledged by the pilot and shall take immediate action to correct any discrepancies or omissions revealed by the pilot readback or request "Say again" of the crucial information.	
5 − 1 Cross-checking between PF and PM	**5 Callouts by pilot**
In the case of cross-check based on hearback, the PF verbalizes his or her understanding to the PM to verify that the PM's understanding aligns with the PF's own interpretation of the instructions. This ensures both pilots share the same understanding.	Cross-checking or verbal verification is not necessary in the absence of a second pilot. If the controller does not intervene upon completion of step 1 to 4, it is assumed that the pilot readback is correct. Still, callout is effective for the pilot to help check the pilot's own understanding of the given instructions or clearances following readbacks, resetting the FMS to the assigned clearance, or executing instructions or clearances.
5 − 2 Verbal Verification	
A potential issue in the next step concerns the pilot-airplane interface. That is to say, even if the PF understands the instructions, the PF may still make a mistake in the execution of said instruction. To avoid such problems, the PF must verbalize his or her actions while completing such actions. The PM monitors the PF's actions. The PM also verbalizes his or her observation of the PF to ensure the PF's actions are completed as intended. For example: 1) PF resets the FMS/Flight Mode 2) PF verbalizes the FMS/Flight Mode 3) PM monitors PF and verbalizes resetting the FMS/Flight Mode 4) PM ensures PF's actions match intent 5) PF and PM both verbalizes the PFD, a device which provides information for altitude and navigation control status This is called "Verbal Verification". This action serves to minimize error by PF executing something else despite knowing what to do by synchronizing understanding and physical movements with verbalizations. For clearances involving runways, "Hold short of runway," "Line up and wait," or "Cross runway", pilot must use "Verbal Verification" prior to entering the runway to confirm correct reception of the clearance.	

Conclusion

It is the earnest and collective desire of controllers and pilots to prevent runway incursions.

Have you experienced a situation where you "didn't feel right" or felt "something is off" in ATC communications? Such feelings are often accurate. While dismissing these feelings may not always result in runway incursions, a potential risk of runway incursions may continue to exist.
As aviation professionals, regardless of one's level of experience, it is vital to acknowledge those subtle warnings and translate them into concrete action.

Even more importantly, communication skills are needed more than ever for both controllers and pilots. Mastery of the ATC radio communication procedures, avoiding misunderstandings by the application of the communication loop mechanism, and using empathy in communication to build trust constitute a solid basis for successful ATC communication.

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