

When Things Go Wrong on the Production Line

A Case Study in Technical Communication & Workplace English

LESSON OVERVIEW

Level: B2 | Duration: 60–75 minutes | Format: 1-to-1

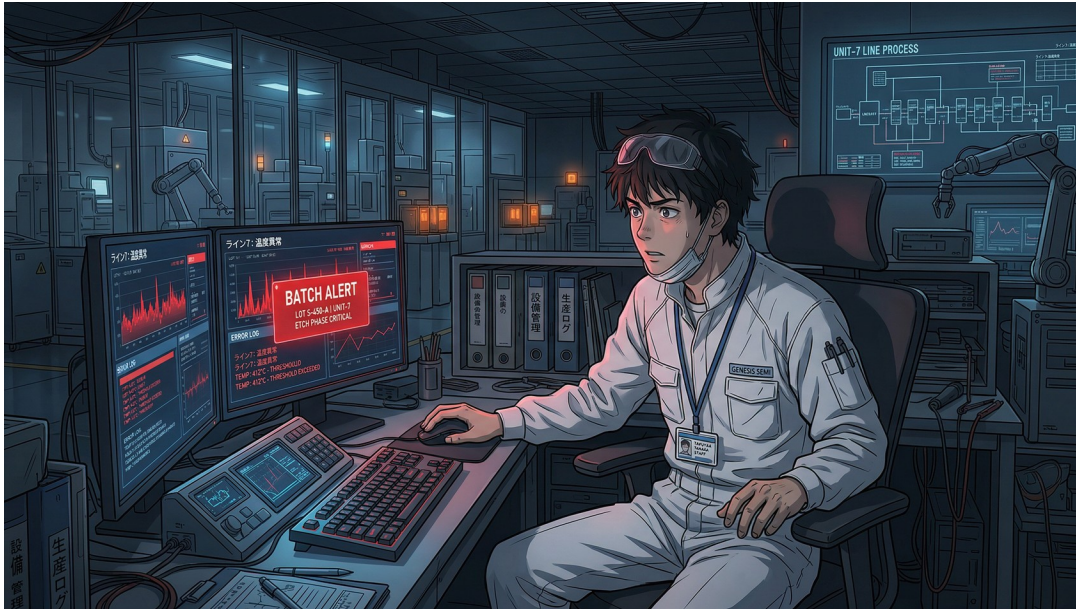
Skills: Reading • Vocabulary • Grammar • Speaking

Grammar focus: Past simple, present perfect, past perfect, future perfect,
present continuous

Topic: Quality control failure in semiconductor ceramic manufacturing

PART 1 — Warm-Up (5 minutes)

Look at the image below. Answer these questions without reading any text yet.



Warm-up questions — discuss with your teacher:

1. What do you think this person does for a living?
2. What time of day do you think it is? How do you know?
3. What problem do you think he has just discovered?
4. Have you ever received an urgent alert or message at work? What happened?

PART 2 — Vocabulary Review (10 minutes)

Step 1 — Reference Table

Study these ten terms before you read the story. Pay attention to how each word is used in context.

Term	Definition	Example sentence
batch variability	differences in quality or properties between groups of products made at the same time	"Batch variability increased after the calibration error."
defect rate	the percentage of products that fail to meet quality standards	"A defect rate above 2% triggers a line shutdown review."
sintering	a heat process that bonds ceramic or metal powder into a solid mass without melting it	"The parts go through sintering at over 1,500 degrees Celsius."
microcrack	a tiny crack, often invisible to the naked eye, that weakens a material	"Microcracks appeared on the substrate after the furnace cycle."
thermal expansion	the tendency of materials to increase in size when heated	"Different materials have different rates of thermal expansion."
tolerance threshold	the maximum acceptable level of variation or error in a process or product	"The deviation was outside the tolerance threshold by 12%."
corrective action	a step taken to fix a problem and prevent it from happening again	"Management approved the corrective action plan immediately."
root cause	the fundamental reason a problem occurred, found by investigating beyond surface symptoms	"The root cause was a misconfigured temperature ramp-up setting."
escalate	to report a problem to a higher level of authority because it exceeds normal limits	"He decided to escalate the issue to the section manager."
feedback loop	a system in which the output of a process is used to adjust or improve the process itself	"The feedback loop between calibration staff and supervisors had broken down."

Step 2 — Gap Fill

Complete each sentence below using a word or phrase from the word bank. Each item is used once.

Word Bank (randomized):

corrective action / root cause / batch variability / thermal expansion /
microcrack / sintering / feedback loop / defect rate / escalate / tolerance threshold

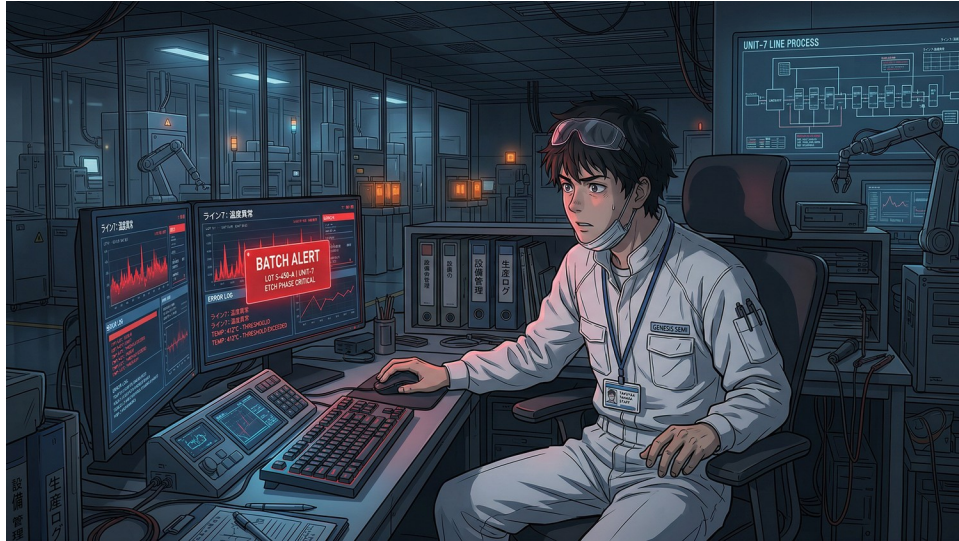
1. After the _____ process, the alumina substrates are inspected for surface defects.
2. The _____ on this batch rose to 4.2%, which is double the acceptable level.
3. Under a microscope, engineers found a _____ running along the edge of the component.
4. When _____ is high, it usually means the process is not stable or well-controlled.
5. The deviation was outside the _____, so the line was temporarily stopped.
6. The engineer needed to _____ the issue to his section manager by 9:00 AM.
7. The _____ between the calibration team and night supervisor had completely failed.
8. A mismatch in _____ rates between the ceramic and the metal frame caused stress fractures.
9. Without identifying the _____, the same problem is likely to happen again.
10. Management approved the _____ plan and asked for a progress report by Friday.

Answer key (teacher reference): 1-sintering 2-defect rate 3-microcrack 4-batch variability 5-tolerance threshold 6-escalate 7-feedback loop 8-thermal expansion 9-root cause 10-corrective action

PART 3 — Reading (10 minutes)

Read the three scene descriptions below. Pay attention to the highlighted verb phrases — you will analyze the grammar in Part 4.

Scene 1 — The Problem Emerges



Takuya has just received [1] an alert from the night shift supervisor: batch variability has spiked [2] on the alumina substrate line. The defect rate is above tolerance — specifically, microcracks are appearing [3] on parts after the sintering furnace stage. Yield loss on this batch is currently running [4] at 4.2%, double the acceptable threshold.

He pulled up [5] the process data log and noticed [6] a pattern: the issue began [7] around 2:00 AM, shortly after a scheduled equipment calibration. He suspects a thermal expansion mismatch due to an incorrect furnace temperature profile entered during calibration.

Scene 2 — The Investigation



Takuya headed [8] to the cleanroom floor to inspect the parts firsthand and speak with the night-shift technician. He examined [9] surface roughness data and checked [10] the slurry composition records from the previous 12 hours. By the time he reached his initial conclusions, he had already worked [11] through a standard 5-Why root cause analysis.

His key findings: the furnace cycle time had been shortened [12] by 8 minutes during calibration; the tolerance adjustment had been made [13] outside spec; and no one had escalated [14] the deviation because the feedback loop between calibration staff and the night supervisor had broken down [15] .

Scene 3 — The Meeting



At 9:00 AM, Takuya is presenting [16] his preliminary findings to his section manager and two colleagues from Quality Assurance. As he speaks, the manager is taking [17] notes and nodding slowly.

Takuya proposes that by end of week, the team will have implemented [18] a revised calibration protocol and will have retrained [19] all relevant staff. He is careful not to name individuals directly — instead, he focuses on the system failure, not the people.

PART 4 — Grammar Practice (15 minutes)

Quick Reference — Tense Guide

Use this table to help you complete the exercises below.

Tense	Use	Signal words	Example
Past simple	A completed action at a specific time in the past	at 2:00 AM, yesterday, during, when	"The issue began around 2:00 AM."
Present perfect	A past action with a present result or relevance	just, already, since, so far, recently	"The defect rate has spiked this morning."
Past perfect	An action completed before another past action	by the time, already, had (before past event)	"He had already finished the analysis before the meeting."
Future perfect	An action that will be completed before a future point in time	by [time], will have + past participle	"By Friday, they will have fixed the protocol."
Present continuous	An action happening right now, or a developing situation	right now, at the moment, currently, is/are + -ing	"He is presenting his findings."

Exercise A — Identify the tense [numbered 1–7]

Look back at the reading. For each numbered verb phrase [1]–[7], write the tense name and explain in one sentence why that tense is correct.

Verb phrase	Tense	Why is this tense correct here?
[1] has just received	Tense: _____ –	Why? _____
[2] has spiked	Tense: _____ –	Why? _____
[3] are appearing	Tense: _____ –	Why? _____
[4] is currently running	Tense: _____ –	Why? _____
[5] pulled up	Tense: _____ –	Why? _____
[6] noticed	Tense: _____ –	Why? _____

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[7] began	Tense: _____	Why? _____

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Exercise B — Choose the correct verb form

Circle or underline the correct option. Be prepared to explain your choice.

1. By the time the manager arrived at 9:00 AM, Takuya _____ his analysis. (finished / had finished / has finished)
2. The defect rate _____ 4.2% since the calibration error. (reached / has reached / had reached)
3. Right now, the night technician _____ the furnace settings with a senior engineer. (reviews / reviewed / is reviewing)
4. The calibration team _____ the deviation at 2:00 AM, but nobody reported it. (noticed / has noticed / had noticed)
5. By Friday, the team _____ the revised protocol to all three production lines. (will apply / will have applied / applies)
6. The feedback loop _____ at some point before the night supervisor came on duty. (broke down / has broken down / had broken down)
7. Currently, the QA team _____ all parts from the affected batch. (quarantines / quarantined / is quarantining)
8. Takuya _____ this type of defect in his five years at the company. (never saw / has never seen / had never seen)

Answer key (teacher): 1-had finished 2-has reached 3-is reviewing 4-noticed 5-will have applied 6-had broken down 7-is quarantining 8-has never seen

PART 5 — Role Play (15–20 minutes)



This is Scene 3. You are Takuya. Your teacher is the Section Manager (課長).
The meeting has just started. Present your findings and handle the manager's questions professionally.

Context

Your role: Takuya Hayashi, Process Engineer, Ceramics Line
Manager's role: Section Manager (課長)
Setting: 9:00 AM briefing, formal meeting room
Your goal: Report the defect issue, explain the root cause,
and propose corrective action — without blaming individuals directly.

Language Focus for This Activity

Try to use these structures naturally during the role play:

Reporting a problem (present perfect):

"We have identified a batch variability issue on the alumina line."

"The defect rate has exceeded the tolerance threshold."

Explaining the timeline (past simple / past perfect):

"The issue began around 2:00 AM, shortly after the calibration."

"By the time I arrived on the floor, the batch had already been processed."

Proposing future action (future perfect):

"By end of week, we will have implemented a revised protocol."

"We will have retrained the calibration team by next Monday."

Softening / avoiding direct blame:

"It appears that the communication channel was not functioning as expected."

"There may have been a gap in the escalation process."

"The system did not flag the deviation automatically."

Manager's Question Bank (teacher guide)

Use 4–6 of these questions, increasing pressure gradually:

1. What exactly is the current status of the affected batch?
2. When did you first become aware of the problem?
3. Why wasn't this issue caught during the night shift?
4. Who was responsible for the calibration check?
5. What steps have you already taken since you got the alert?
6. What will you have done by the end of this week to prevent a recurrence?
7. How confident are you that the root cause has been correctly identified?
8. Is there any risk this has affected other production lines?

Self-Reflection (after the role play)

Discuss these questions with your teacher:

- Did you use the target tenses accurately? Which was the most challenging?
- How did you avoid assigning direct blame? Was it effective?
- In your own company, how would this type of meeting be handled differently?
- What Japanese business communication norms were at play in this situation?

Homework (optional)

Write a 150–200 word email from Takuya to his section manager summarizing the meeting outcomes and the corrective action plan. Use at least three of the five target tenses.

Checklist for your email:

- Clear subject line
- Formal opening
- Summary of the problem (what has happened)
- Root cause (what had gone wrong)

- Corrective action steps (what you will have completed by when)
- Polite closing