Themes & Systems
SAFETY INVESTIGATION

CIVIL AVIATION AUTHORITY
OF NEW ZEALAND
Te Mana Rererangi Tūmatanui o Aotearoa

If you want to find out more about TSSI, you can contact us at:
www.caa.govt.nz/accidents-and-incidents/

The value of identifying precursors

The traditional role of safety investigation has been to analyse accidents and serious incidents to determine the causal factors, and prevent reoccurrence. It is still important to continue to do this, and in the event of an incident you will still be required to complete a report.

This is a reactive approach however. It doesn't always take into account relatively minor events that may not have resulted in serious consequences. In the context of TSSI we need to gain the full contextual picture of what the situation was at the time of an event, and what led up to it. It is also essential to consider and include any precursors in the report. Precursors are those factors which preceded an event, but on their own may not necessarily cause it.

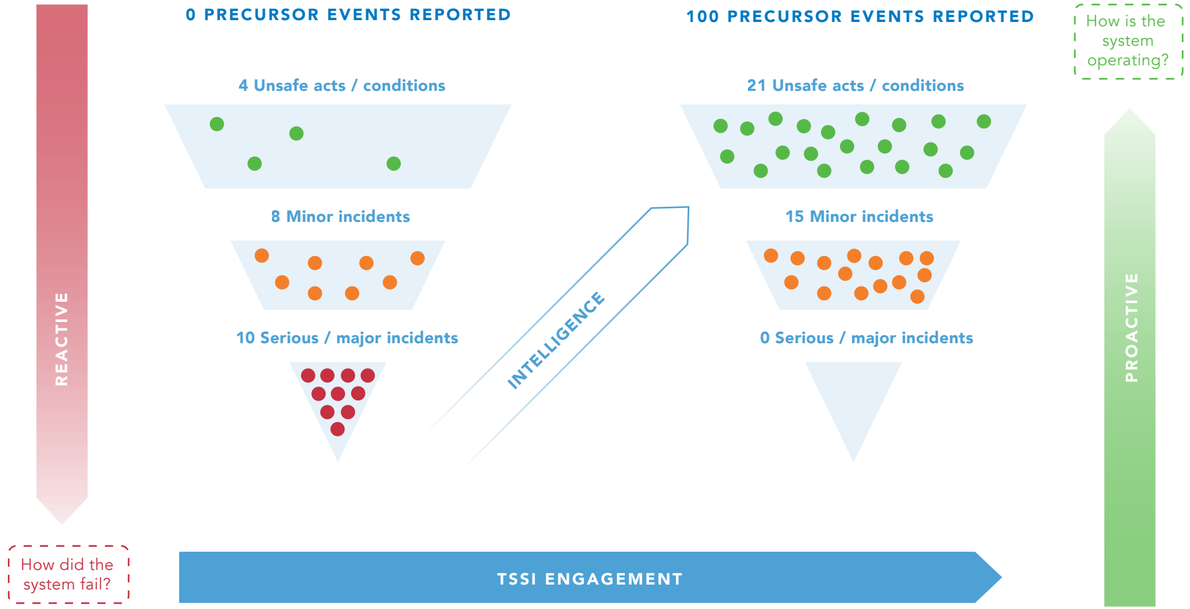
Having an awareness and understanding of the precursors means we can define and implement strategies to address the risk factors, limiting serious outcomes and improving the safety of the aviation system.

You can find an example of a CA005 report showing the inclusion of precursors on the CAA website.

Possible outcomes from a TSSI approach

The following example illustrates what a TSSI approach may achieve.

A participant was having a safety issue but couldn't identify what was creating the problem. Taking a TSSI approach, the problem was defined and solutions implemented. The diagram below shows how engaging the TSSI approach provides an increase in the intelligence about the problem, enabling a reduction of the serious/major incidents. Engaging with the participants, and understanding how the system was operating, enabled an understanding of the constraints, pressures, demands, and interactions that were leading to the unintended outcomes. This contextual information enabled appropriate safety improvements to be made.



Themes & Systems
SAFETY INVESTIGATION

DEFINING THE PROBLEM

A SYSTEM APPROACH TO TACKLING COMPLEX ISSUES

CIVIL AVIATION AUTHORITY
OF NEW ZEALAND
Te Mana Rererangi Tūmatanui o Aotearoa

Themes and Systems Safety Investigation

The Civil Aviation Authority (CAA) places priority on being intelligence driven and having a risk-based focus. We seek to identify aviation system risks, understand the nature of those risks, and focus resources on them.

Due to the complexity of the aviation system we work in, traditional investigation approaches can fall short at identifying all failure modes.

Most problems and possibilities for safety improvement belong to the system, rather than isolated individuals, events, or outcomes. In a system, everything is connected to something; nothing is completely independent. People interact with each other, with types of equipment, with information, and with procedures.

Although reactive cause-effect investigation is still crucial in understanding what went wrong in a specific incident, we are recognising the importance of a proactive approach, understanding how the system operates.

What is a Themes and Systems Safety Investigation?

A Themes and Systems Safety Investigation (TSSI) takes a system-wide view to problem-solving possible safety risks across the aviation system.

There are two components:

- Theme investigations identify patterns or similarities in the precursors observed in occurrences or safety data.
- System investigations examine the socio-technical systems in operation to determine those factors creating the problem.

The TSSI approach means operating collaboratively and cross-functionally across the CAA, industry, and involved parties, to proactively investigate for system safety improvements.

The essence of TSSI is to precisely define what the problem is and why it exists, facilitating systems thinking, providing the right information to the right people, enabling them to do the right things to solve the problem.

Who conducts a TSSI?

A team of safety investigators at CAA are responsible for leading a TSSI. The team engages closely with experts and interested parties from within CAA and across industry. If you are participating in a TSSI, you will be actively involved.

When might you be involved?

Typically a Safety Investigator investigates an event or occurrence – such as an accident, an incident, or a defect. A TSSI Safety Investigator may also approach participants in the absence of an occurrence, to understand how the system is operating with respect to a specific problem being investigated.

The following list is not exhaustive, but will give you an idea of when you might be involved in a TSSI.

- You've had an accident or an occurrence.
- Your operation is an area of focus for the CAA. You can find out more about the focus areas at **www.caa.govt.nz**
- You are part of the system that is of interest.
- You are identified by industry as a champion of safety in a particular area.
- You want to be involved.

What will you be expected to do?

If you are involved in a TSSI investigation, we might invite you to be part of any of the following:

- Panels
- Focus groups
- Working groups
- Surveys
- Face-to-face discussions
- Observations
- Interviews

You may be directly involved because the issue is linked to your type of operation, or you may be providing expertise and input into a sector-wide issue.

The benefits from being involved with a TSSI approach

- The whole TSSI approach is about being proactive and preventing incidents. From an overall system view, and your own organisation view, that is a positive for the sector.
- This is your sector. You've got 'skin in the game'.
- You will have the opportunity to work with the CAA to reduce risk and improve safety for both your organisation and across the sector.
- Solutions will most likely come from you as an expert in your operation.
- Collaborating in the process of a TSSI allows you to benefit from the lessons learned as and when they are identified.
- You will see positive improvements in your organisation's approach to reducing risk and improving safety.
- You are contributing to improvements and increased safety across the wider aviation sector.