

Understanding SPAD risk is critical to applying effective control measures, because the precursors to a SPAD are many and varied, and the actual or potential severity of each SPAD can be vastly different. Train protection and SPAD consequence mitigation systems can be effective at managing and reducing the risk but they can also be circumvented or fail.

The majority of SPADs, or limit of authority exceedances, are managed safely, which may be a testament to the inherent safety in rail systems and the skills and training of rail operations personnel. However, the potential consequences of some SPADs can be catastrophic.



Trains colliding at Suongenjoki, Finland.

### What is a SPAD?

Any incident where rolling stock passes a stop indication is referred to as a SPAD (Signal Passed at Danger). It includes any occurrence where rolling stock:

- Passes without authority a signal displaying a stop indication or a stop aspect including but not limited to fixed signals, stop boards, hand signals, or black or improperly displayed signals; or
- Exceeds the limits of authorised movements including in-cab indicators, paper-based and electronic “occupancy authorities” and encroachment on a protected worksite.

To understand how SPADs occur, it is necessary to look at the operational environment of trains driving to wayside signalling systems.

There are a variety of different types of SPADs due to the variety of circumstances. Understanding SPADs by general types is an important starting point for SPAD management. It is common practice to categorise and separate SPADs at a high level according to the nature of how the SPAD occurred, such as:

- Crew/train performance SPAD;
- Return in face of driver (RIFOD) SPAD; and
- Runaway SPAD.

### Why Do SPADs Occur?

SPADs can rarely be attributed to a single cause and are better understood by looking at the full range of possible contributing factors. In general, a SPAD can occur because someone (a driver, signaller or controller) made an error or violation, or because of a technical deficiency associated with rolling stock or infrastructure. These are sometimes referred to as immediate causes because they are the trigger for the SPAD.

Understanding why a SPAD occurred, how often that type of SPAD occurs, and any other trend analysis is vital if the SPAD strategy is to focus on actual risk. Factors for consideration in establishing SPAD risk are shown in Figure 1. Developing a strategy for SPAD risk management should not be considered in isolation. There are other operational lead indicators that can be considered as potential precursor events such as station over runs, speeding events and failure to stop at stations.



Figure 1

### Post SPAD Incident Management

An organisation should be ready to deal with a SPAD if one occurs. The organisational response is critical to the overall management of SPAD risk. Good SPAD investigation is critical to our understanding of SPADs and a failure to investigate SPADs fully can act as a barrier to good SPAD management since a lack of understanding often results in a SPAD reduction strategy that is ineffective in mitigating actual risk.

The requirements of post incident response, interface agreements between rail operators and network managers, and investigation, are also requirements of legislation. RISSB is currently working with industry to develop a new Australian Standard to provide direction in post SPAD management.

For more information regarding SPADs and SPAD Risk Management please refer to the SPAD Risk Management Guideline (RISSB, 2014), Railway Safety Investigation Code of Practice (RISSB, 2008), and other industry generated content on RISSB's website.

### About RISSB

We develop and maintain the Australasian Rail Industry Standards, Rules, Codes of Practice and Guidelines. Our vision is to be the trusted leader in the rail safety co-regulatory environment, providing products and services that enhance safety and efficiency.

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