Best Practices for the Design of the CRO's View of TVS

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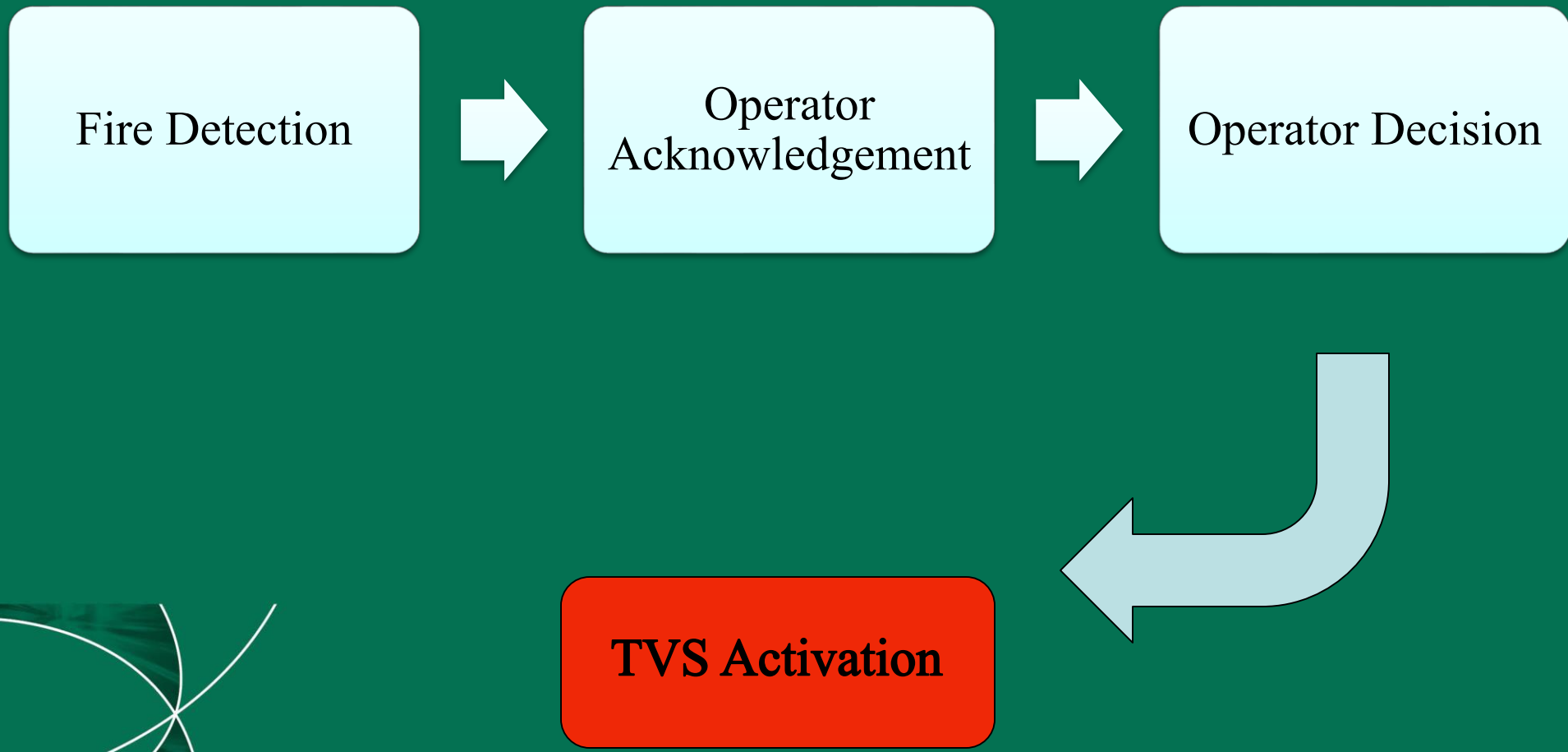
Rail Conference APTA

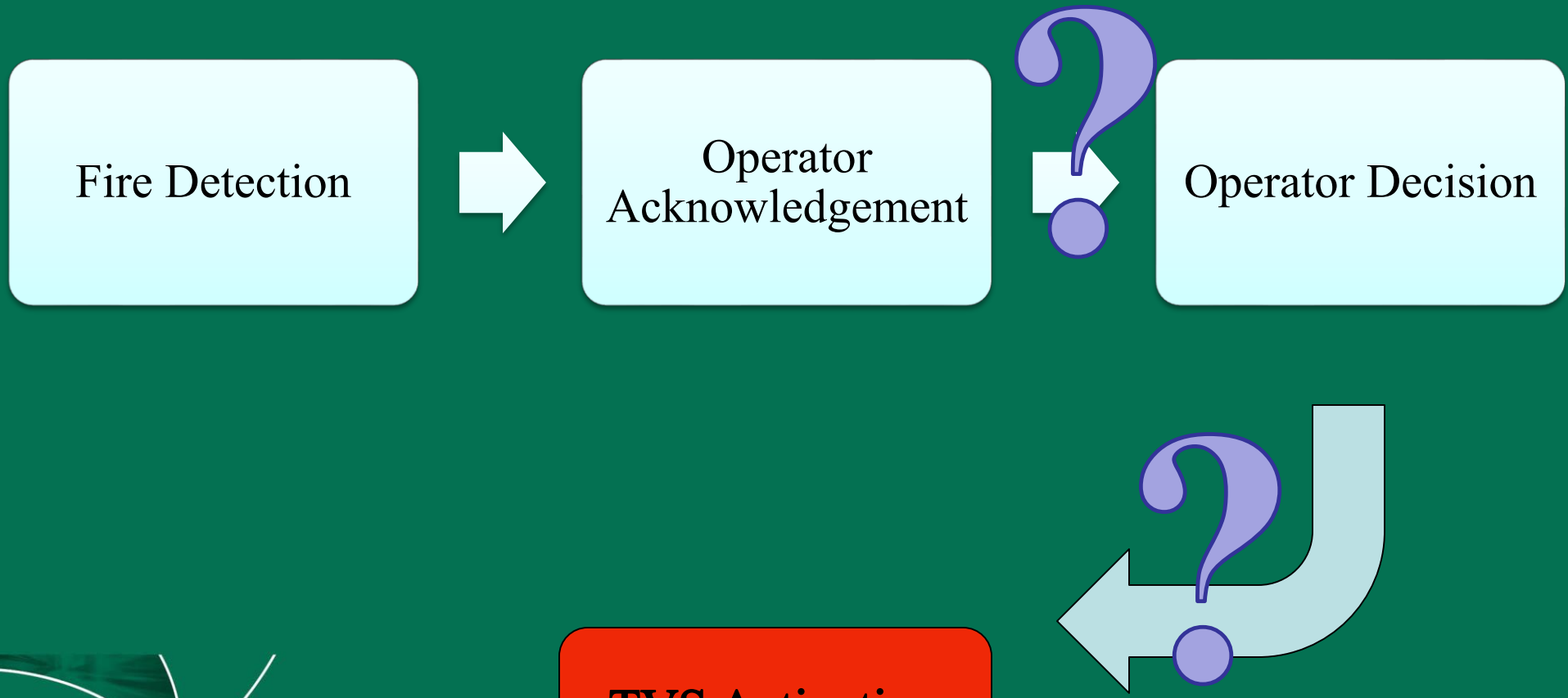
Agenda

- What
- Why
- How
- Examples

What is a Typical TVS Activation Procedure



Typical TVS Activation Procedure



Why is This Important??

- Need to ensure Operator makes the correct decision
- Need to ensure Operator activates the correct TVS mode
- Time is of the essence
- Operators are NOT tunnel ventilation engineers!

Things to Keep in Mind

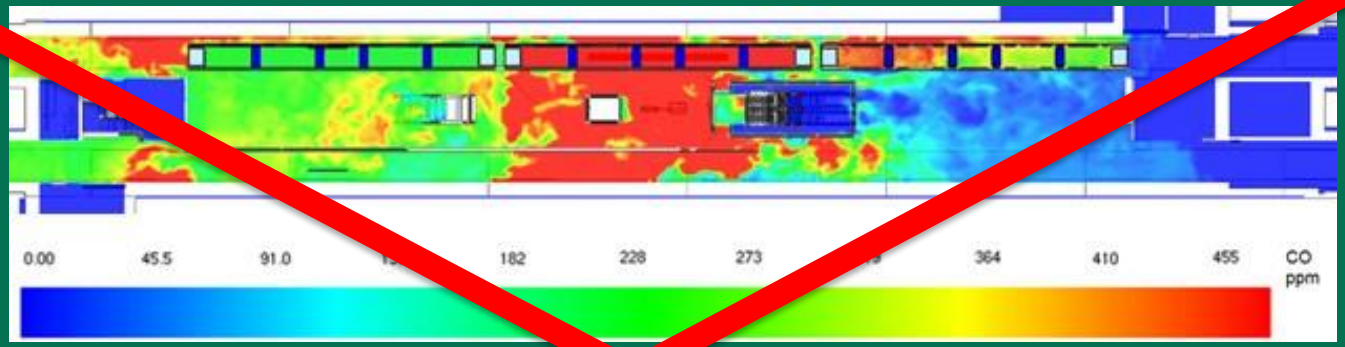
- Simple, intuitive screens to encourage a quick response
- Present all the decision making information necessary on the same screen
- Reliability!!!
- As much of the intelligence is built in as possible

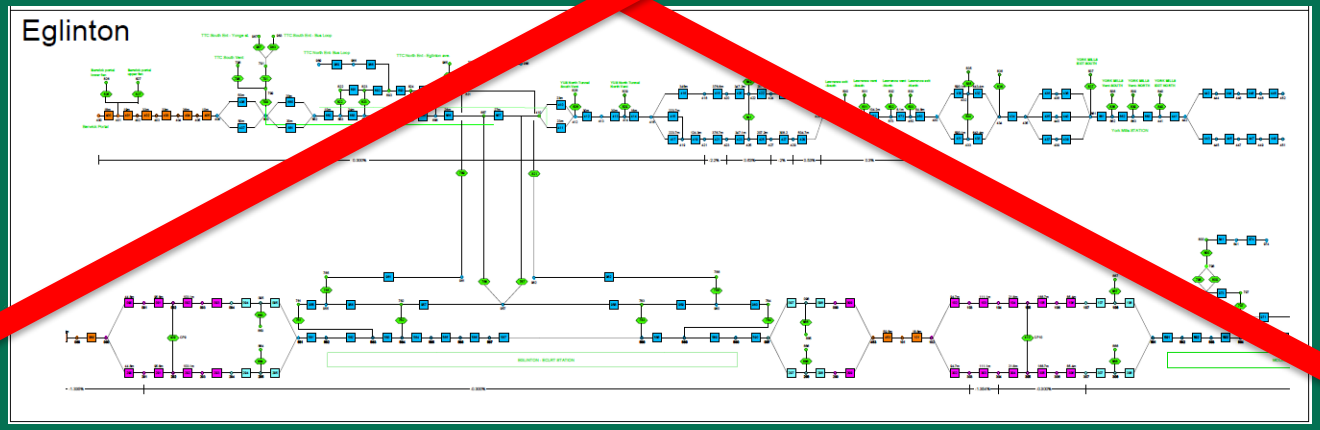
Pitfalls of a Poor Design

- Activating a wrong TVS mode: wrong fans and/or dampers, wrong direction, or insufficient fans
- Activating a contradicting mode
- Not activating the TVS quick enough to facilitate egress during the evacuation period
- Confusion, miscommunication, panic

Pitfalls of a Poor Design

- In a nutshell, none of the models you've run will matter if the Operator doesn't activate the correct mode in time!!!



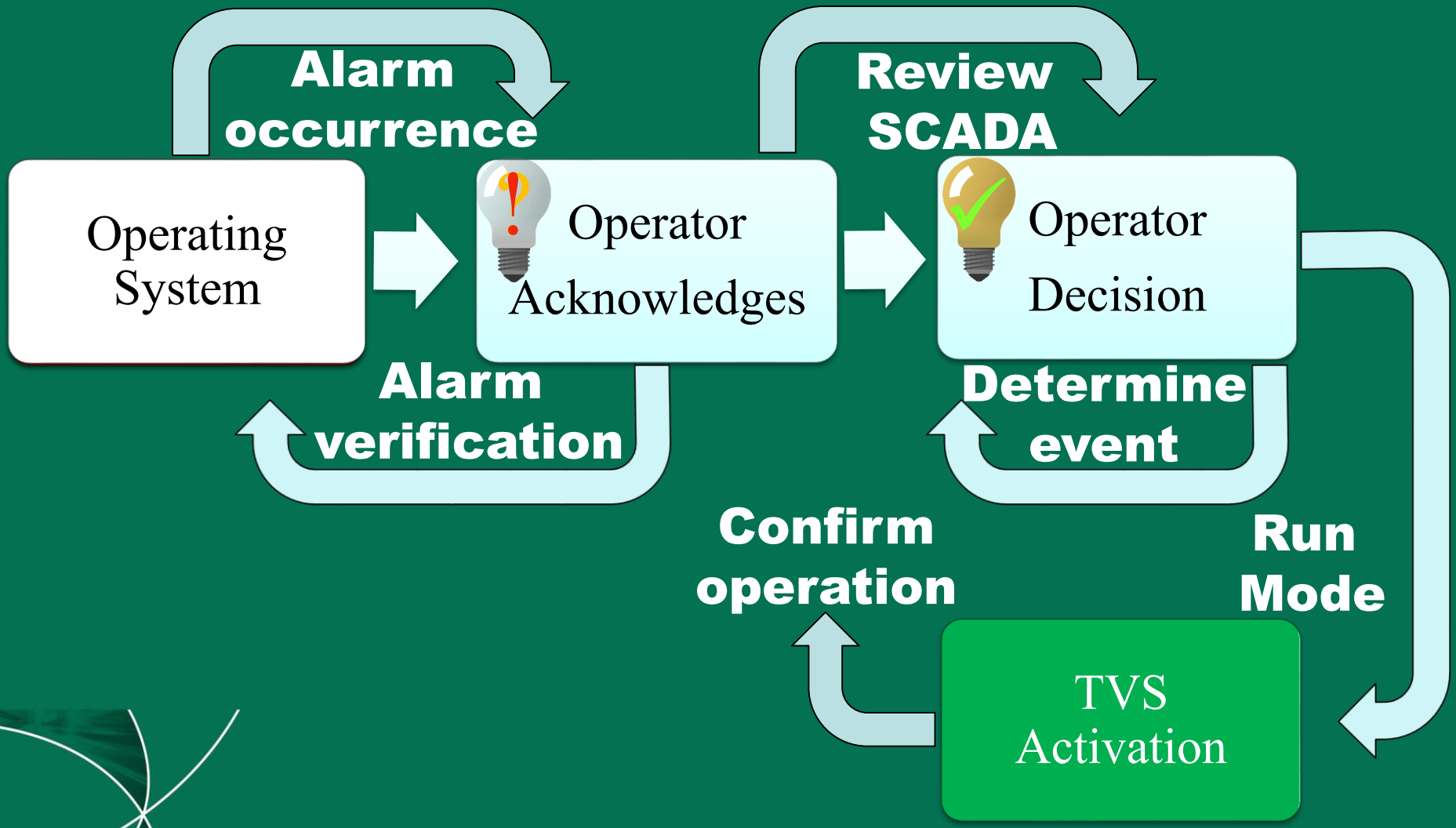


Essentials of Design

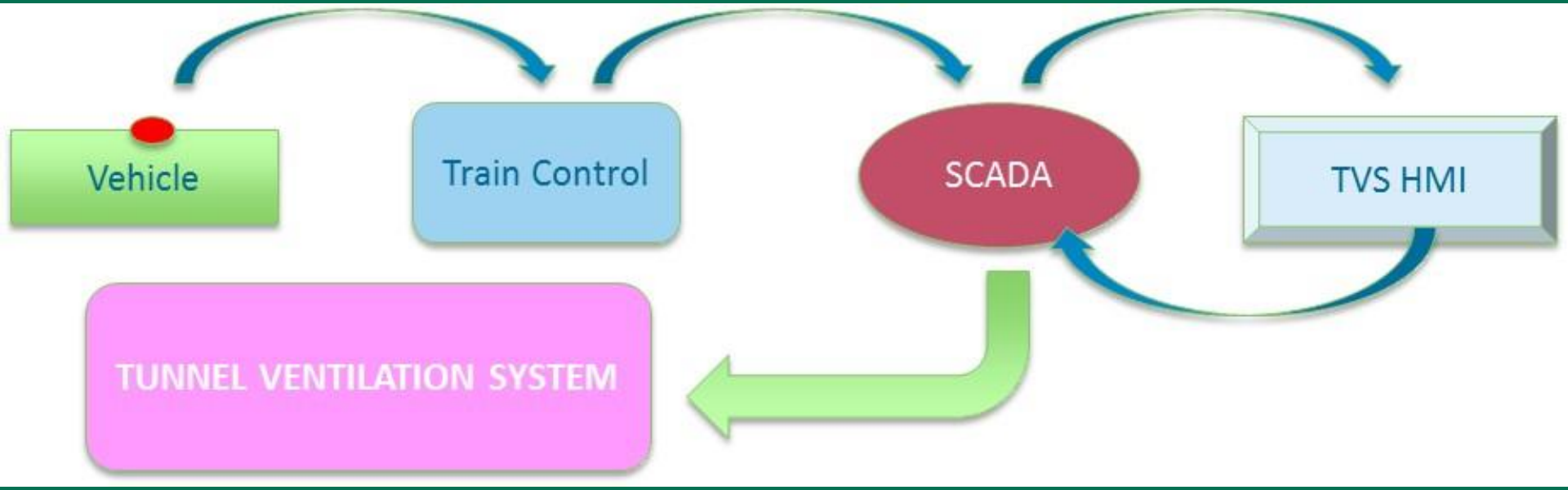
- Graphical HMIs
- Interface to train control system
- Computers are smart! Make them do the work, not the Operator
- Reliability!! – typically SIL 2

SO…what does that look like?

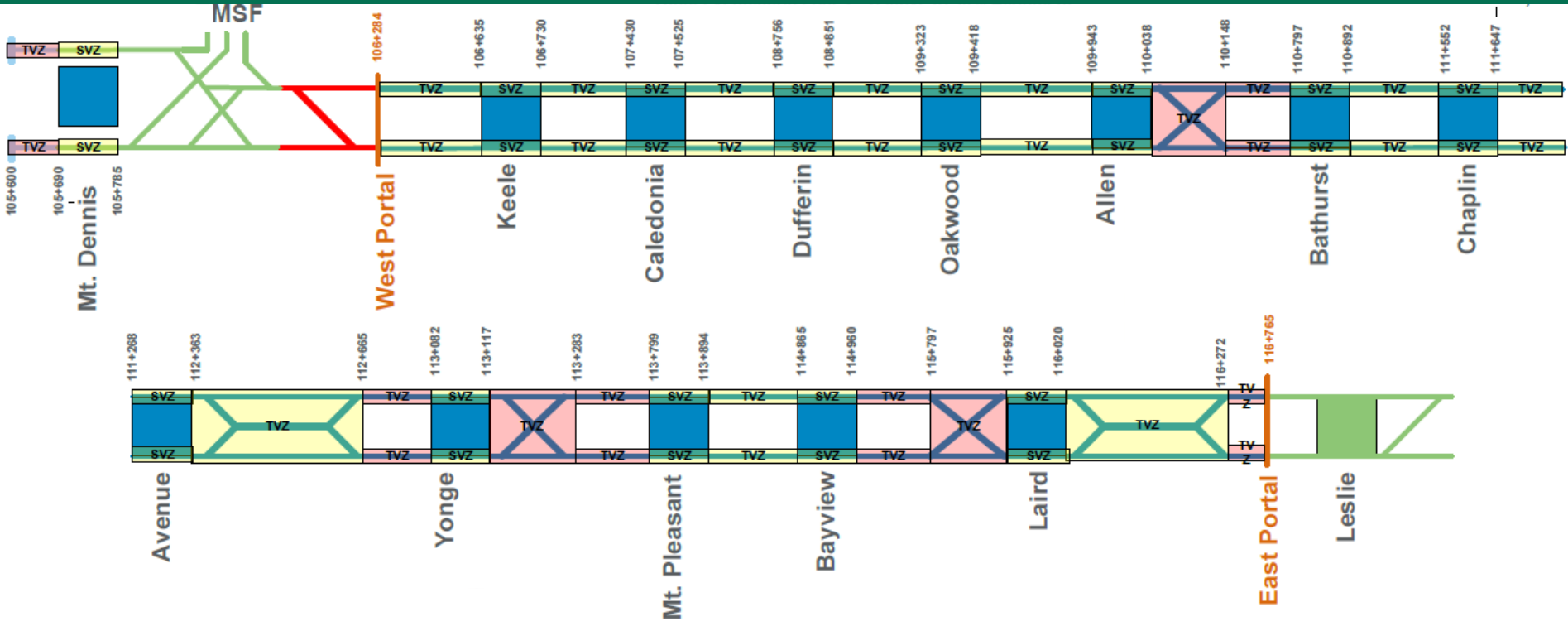
Typical TVS Activation Procedure



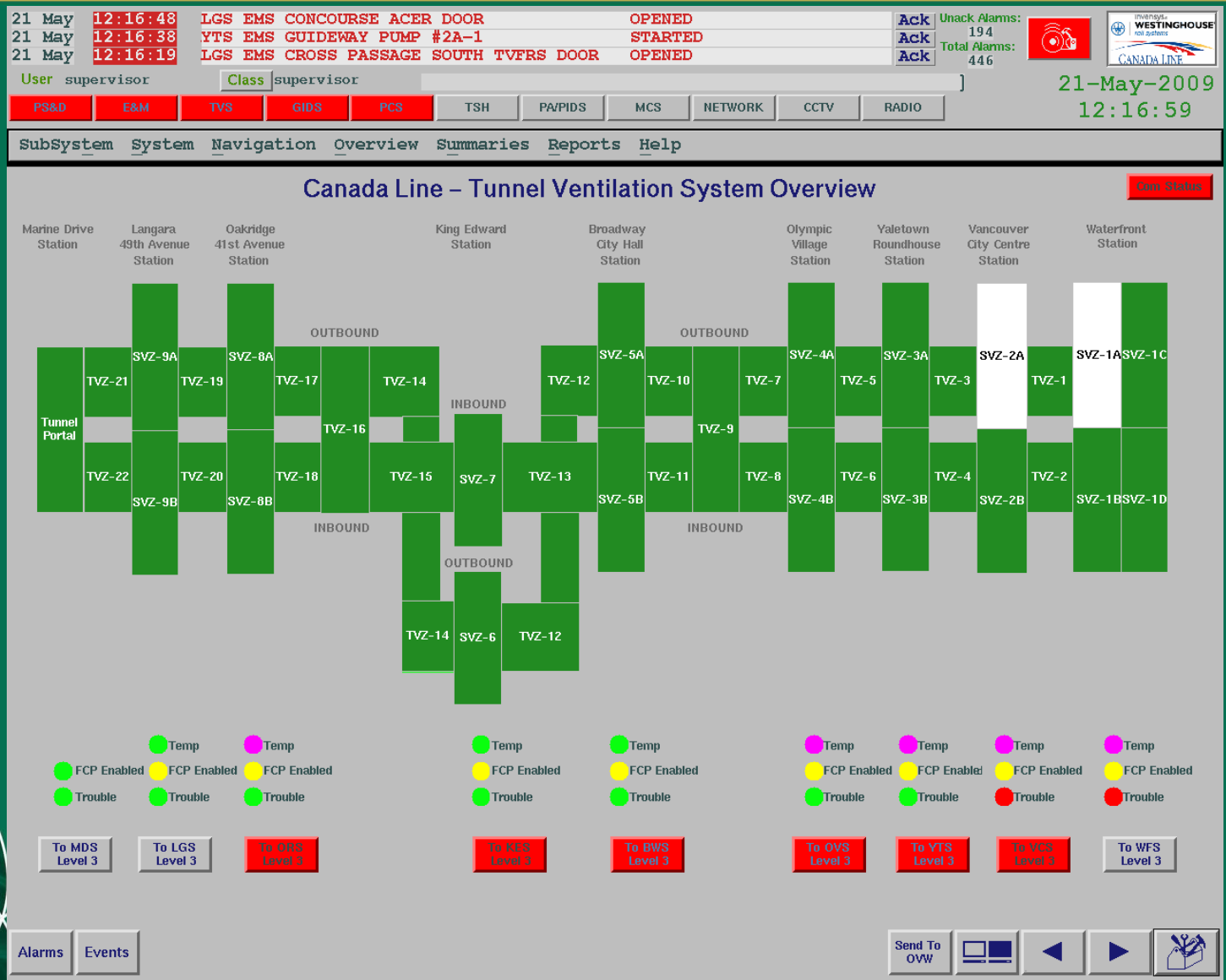
Steps for Emergency Response



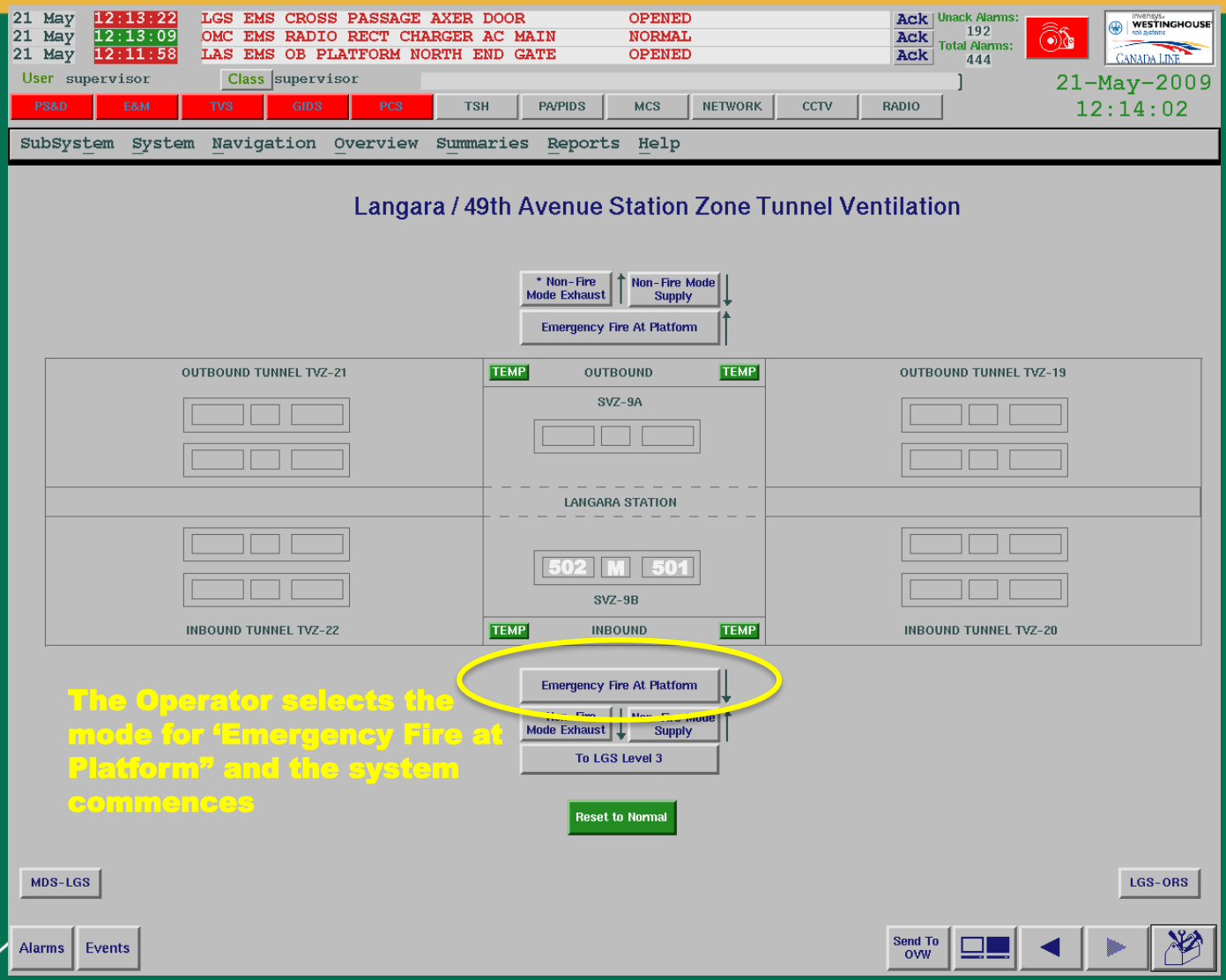
Typical TVS Vent Zone Map



TVS Level -1 HMI
(Canada Line Example)

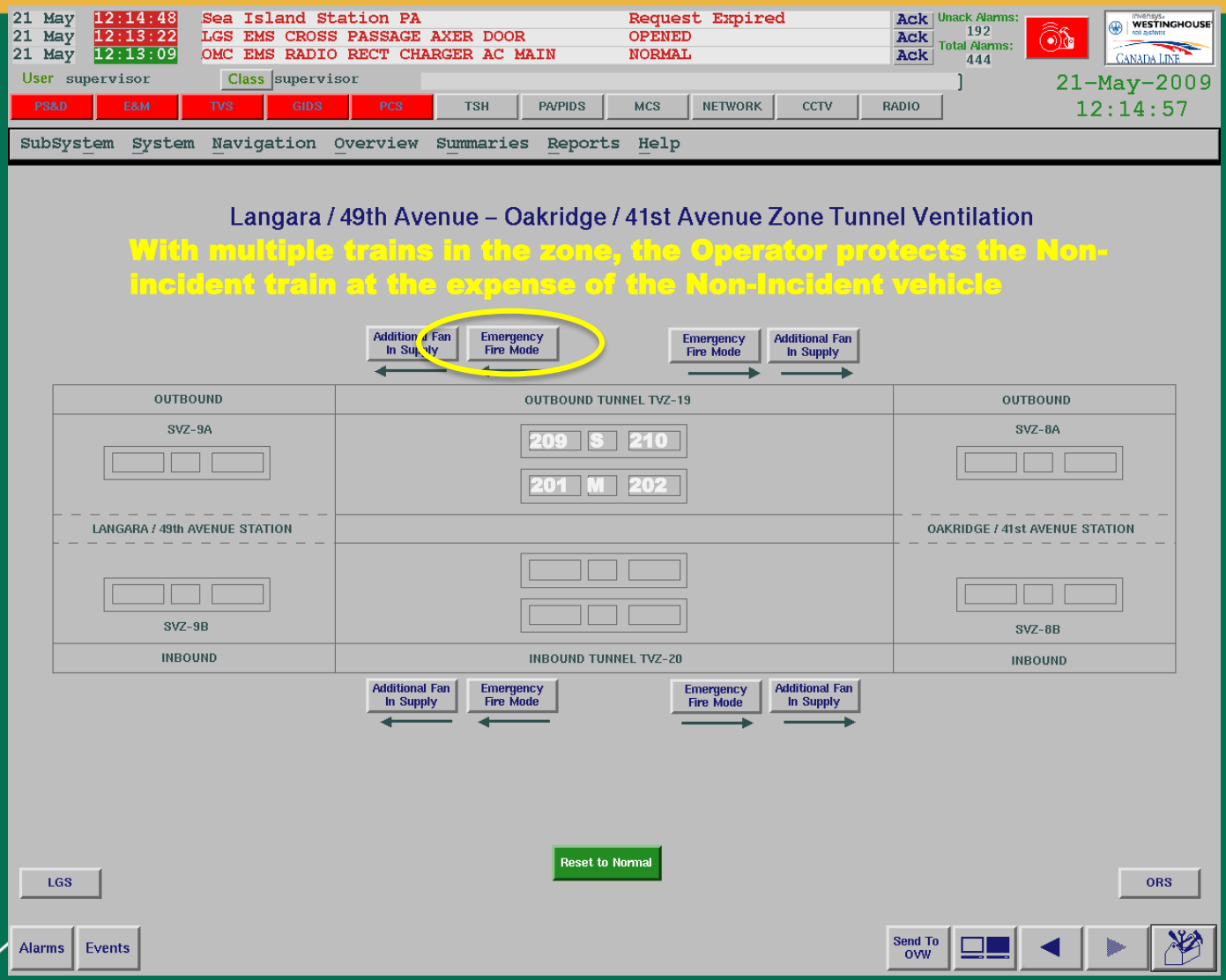


TVS Level-2 SVZ HMI (Canada Line Example)

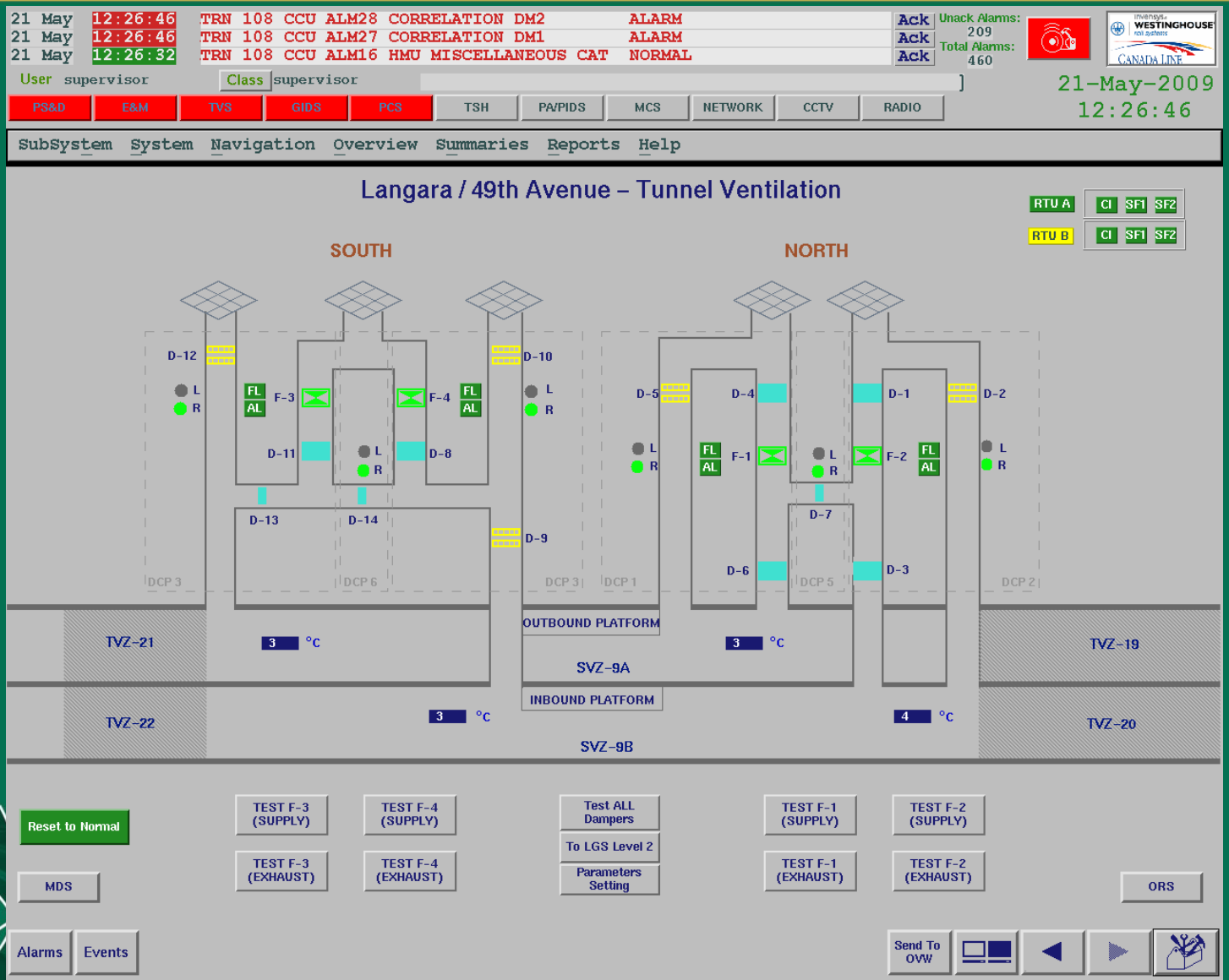


The Operator selects the mode for 'Emergency Fire at Platform" and the system commences

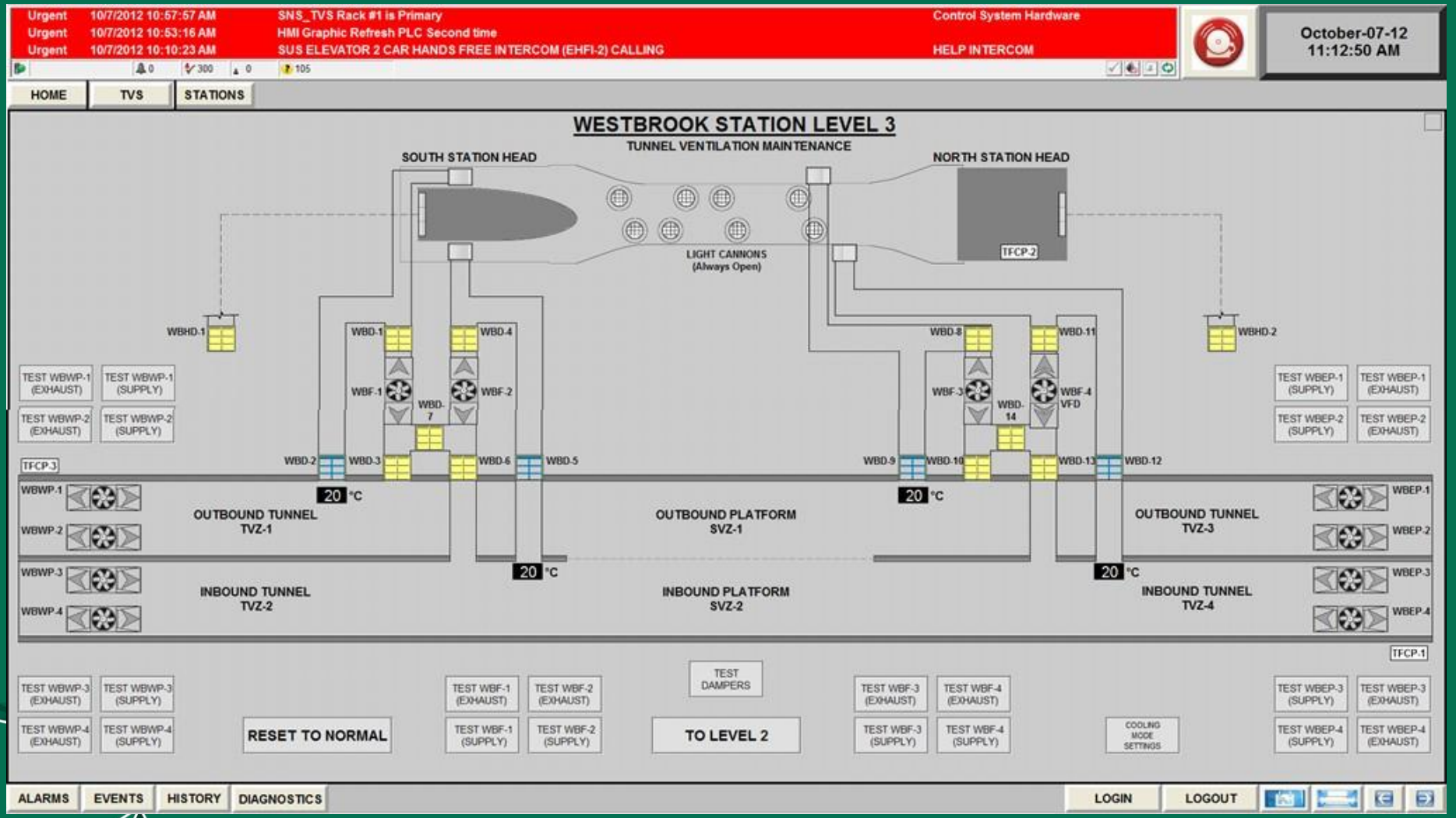
TVS Level-2 TVZ HMI (Canada Line Example)



TVS Level-3 HMI (Canada Line Example)



TVS Level-3 HMI
(Calgary West LRT example)



Key Presentation Take-Aways

- What constitutes successful operation
  - Correct identification of the event
  - Correct identification of the location of the event
  - Correct determination of the course of action required
  - Correct execution of the identified course of action.

Key Presentation Take-Aways

- How do we get there
  - Deliver the Operator clear and concise information
  - Train the Operator to understand what they are seeing
  - Train the Operator to determine what their response must be to the event
  - Provide the Operator with clear and concise methods of undertaking the response

What tools do we need to deliver the desired response

- Good information on location and type of event
- Quick methods of confirming the primary information
- Easily understood data presentation
- Easily operated response.

What tools do we need to deliver the desired response

- Good information – from both facility and vehicles
- Confirmation - by staff or video review
- Data presentation – SCADA system
- Response – SCADA system
- Integration of the TVS and SCADA systems early in the design

Any Questions?