

# NERC

NORTH AMERICAN ELECTRIC  
RELIABILITY CORPORATION

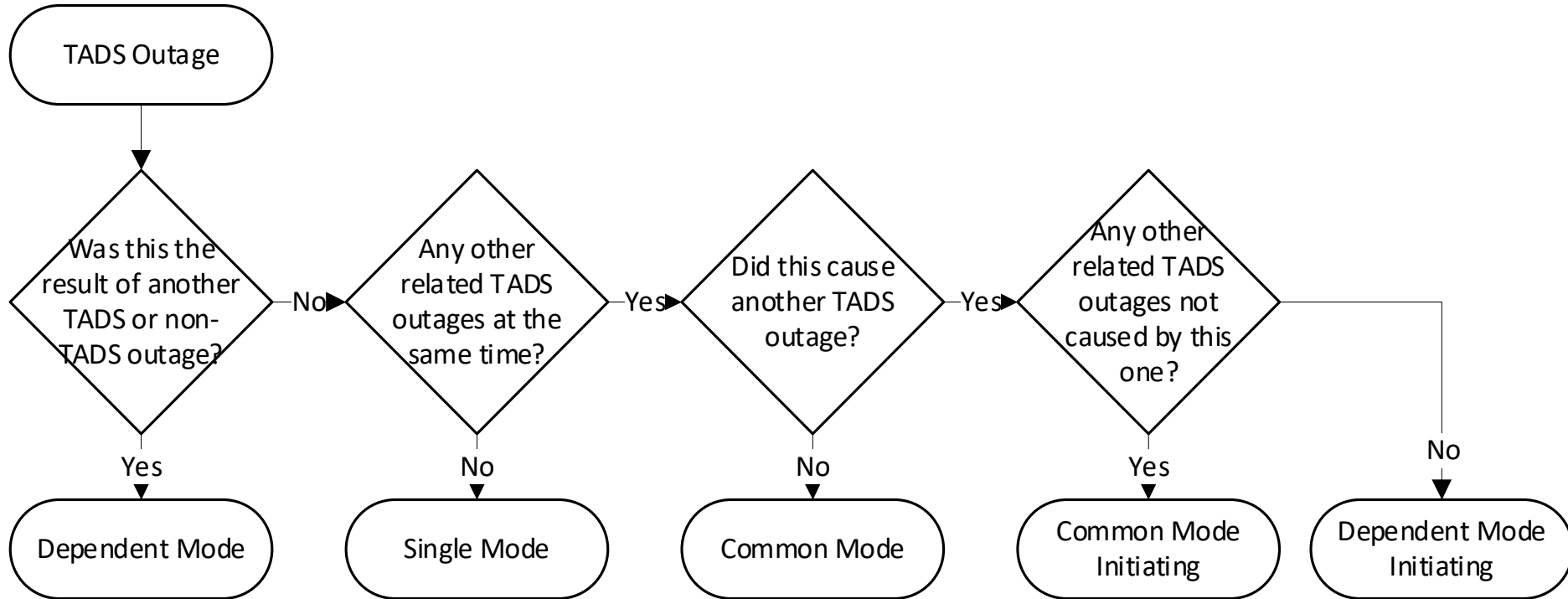
# Outage Modes

November 2021

RELIABILITY | RESILIENCE | SECURITY

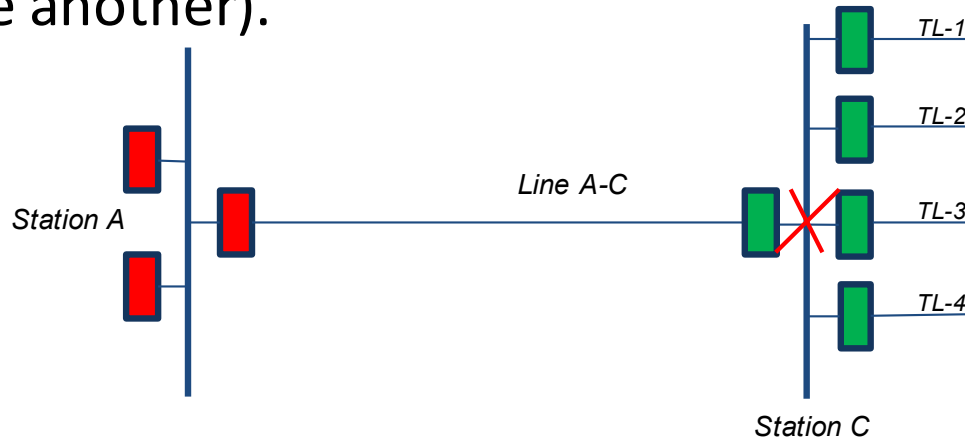


- The Outage Mode Code describes whether an Automatic Outage is related to other Automatic Outages.
  - Single Mode Outage
  - Dependent Mode Initiating Outage
  - Dependent Mode Outage
  - Common Mode Outage
  - Common Mode Initiating Outage



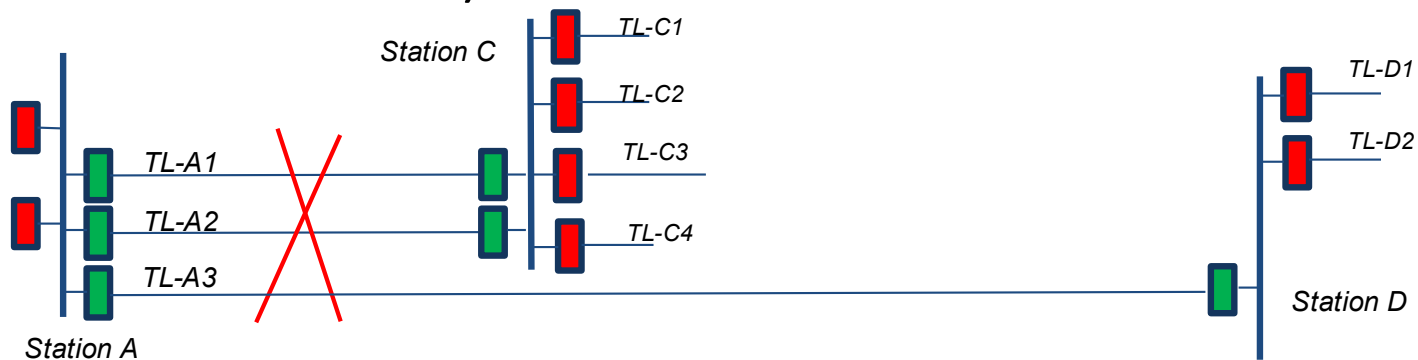
An Automatic Outage of a single Element that occurred independent of any other Automatic Outages (if any).

One of two or more Automatic Outages with the same Initiating Cause Code and where the outages are not consequences of each other and occur nearly simultaneously (i.e., within cycles or seconds of one another).



- *Bus Fault*

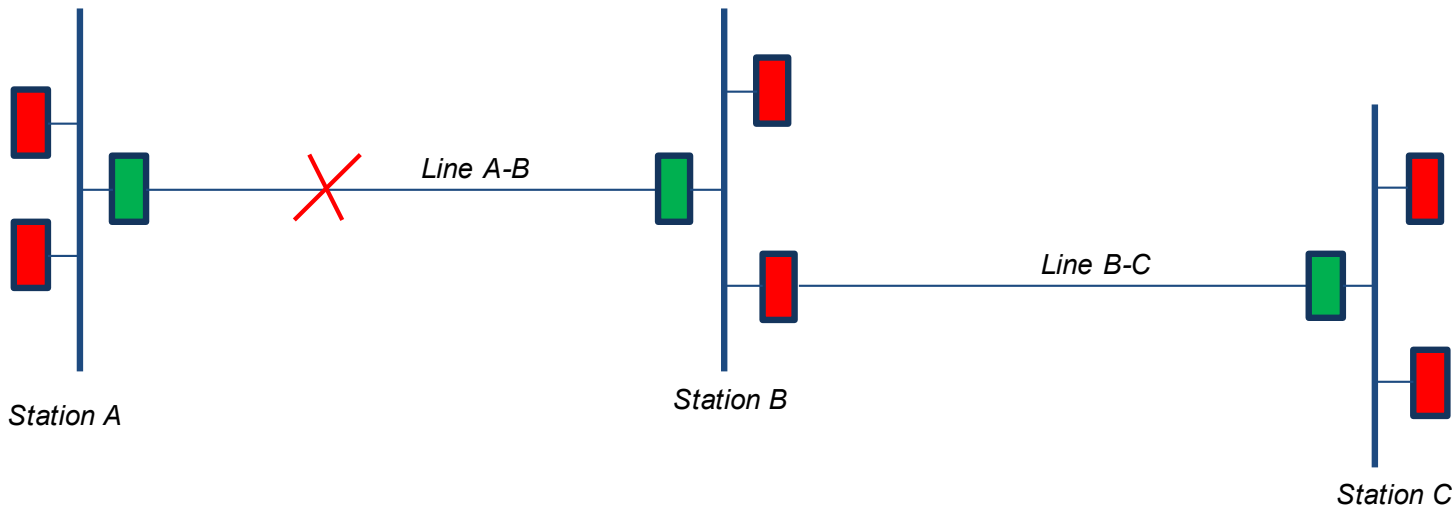
One of **two or more** Automatic Outages with the **same Initiating Cause Code** and where the outages are not consequences of each other and occur nearly **simultaneously** (i.e., within cycles or seconds of one another).



- Single 'Cause' (Lighting, Tornado, etc.), near simultaneous:
  - Do they share tower (River Crossing?) – Common Mode
  - Are they in close proximity, share ROW – Common Mode

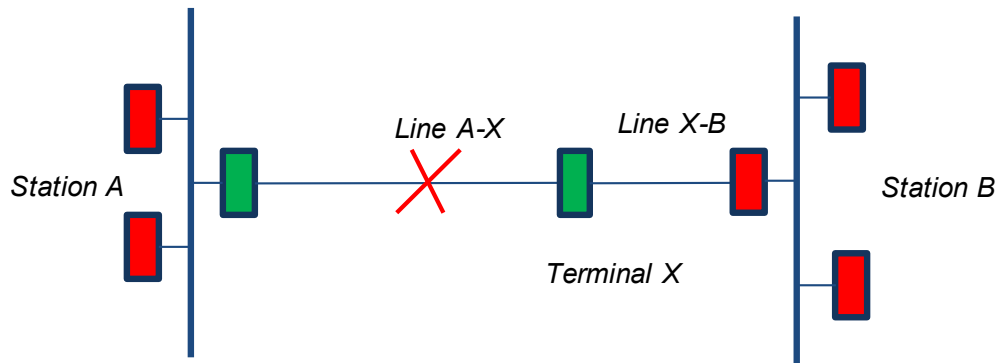
- Two or more outages
- One outage can be non-Element; hence not all Dependent Mode outages will have an associated Dependent Mode Initiating Outage
- Dependent Mode Outage must be a result of another outage.
- Initiating Outage:
  - Single Element: Dependent Mode Initiating Outage
  - Multiple Elements with same Cause at the same time and not consequences of each other: Common Mode Initiating Outage
- Resulting Outage:
  - Single Element: Dependent Mode Outage
  - Multiple Elements with same Cause at the same time and not consequences of each other: Common Mode Outage
  - Multiple Elements with same Cause at the same time and are consequences of each other: Dependent Mode Outage

- Line A-B experiences a fault and Line B-C erroneously trips (relay overtrips) at Station C.
  - Line A-B – Dependent Mode Initiating Outage
  - Line B-C – Dependent Mode Outage

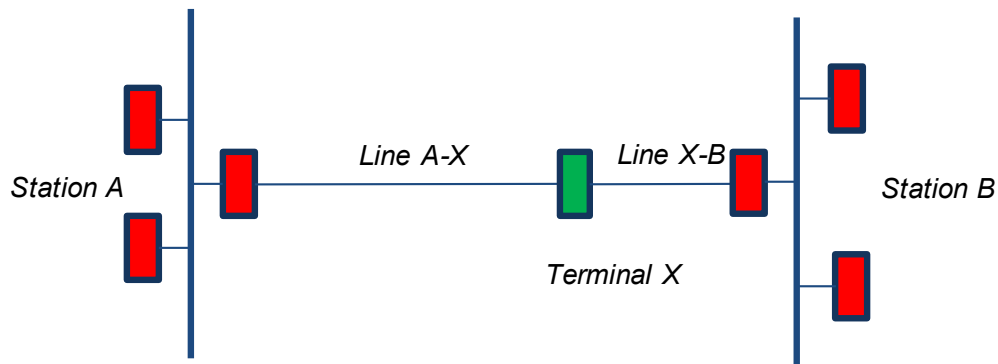




- Lightning strikes Line A-X:
  - Line A-X: Dependent Mode Initiating
  - Line X-B: Dependent Mode

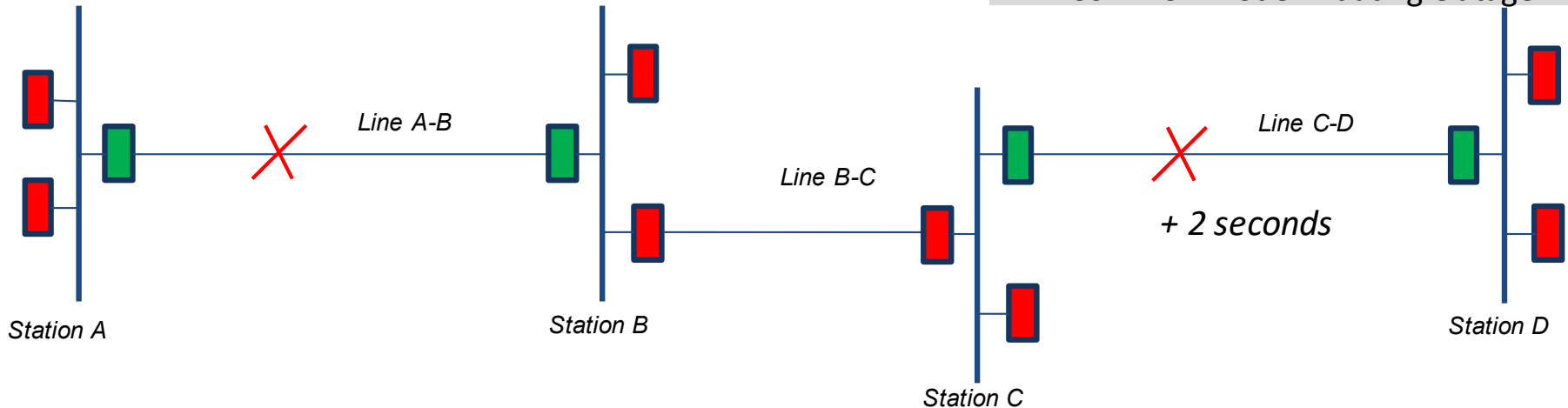


- Breaker at Terminal X trips due to low SF6 gas:
  - Line A-X: Common mode
  - Line X-B: Common mode



Lightning strikes Line A-B and Line C-D a few seconds apart. They don't share ROW or any equipment. All lines are BES elements.

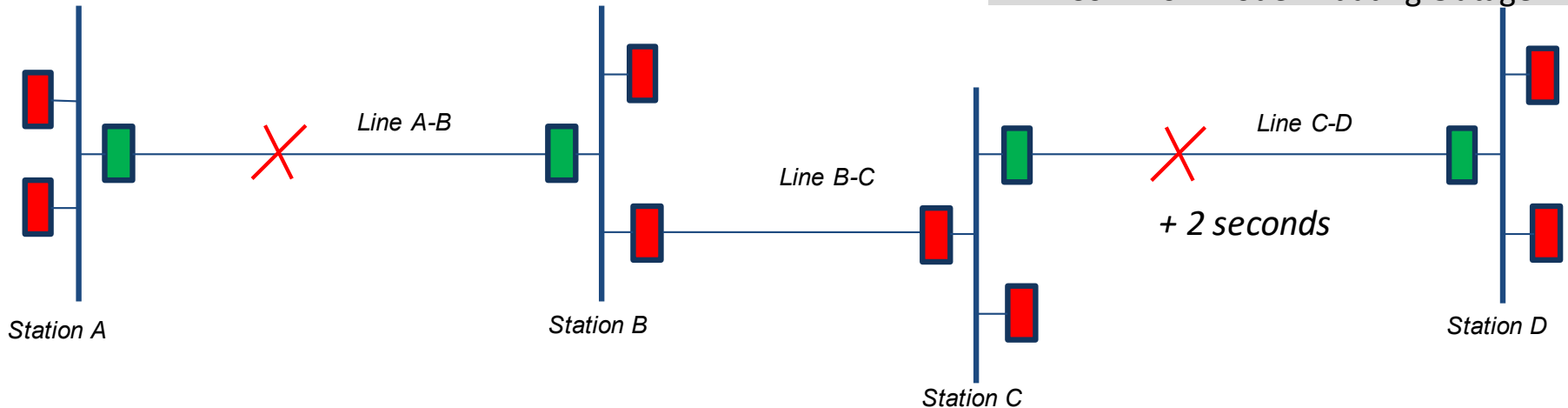
What is the Outage Mode Code for Line A-B?



- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage
- D. Common Mode Outage
- E. Common Mode Initiating Outage

Lightning strikes Line A-B and Line C-D a few seconds apart. They don't share ROW or any equipment. All lines are BES elements.

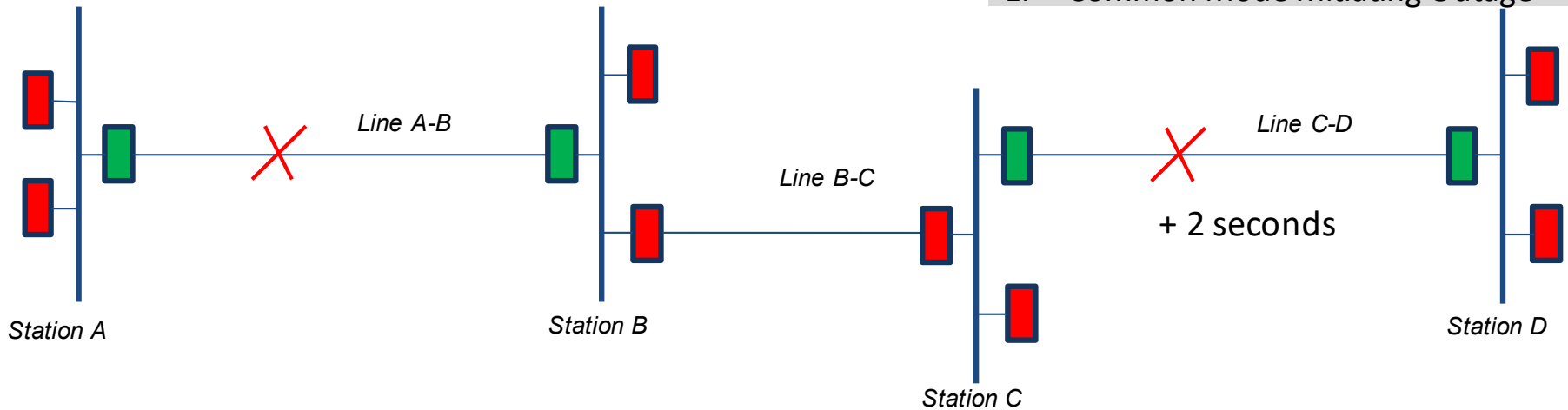
What is the Outage Mode Code for Line A-B?



- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage
- D. Common Mode Outage
- E. Common Mode Initiating Outage

Lightning strikes Line A-B and Line C-D a few seconds apart. They don't share ROW or any equipment. All lines are BES elements.

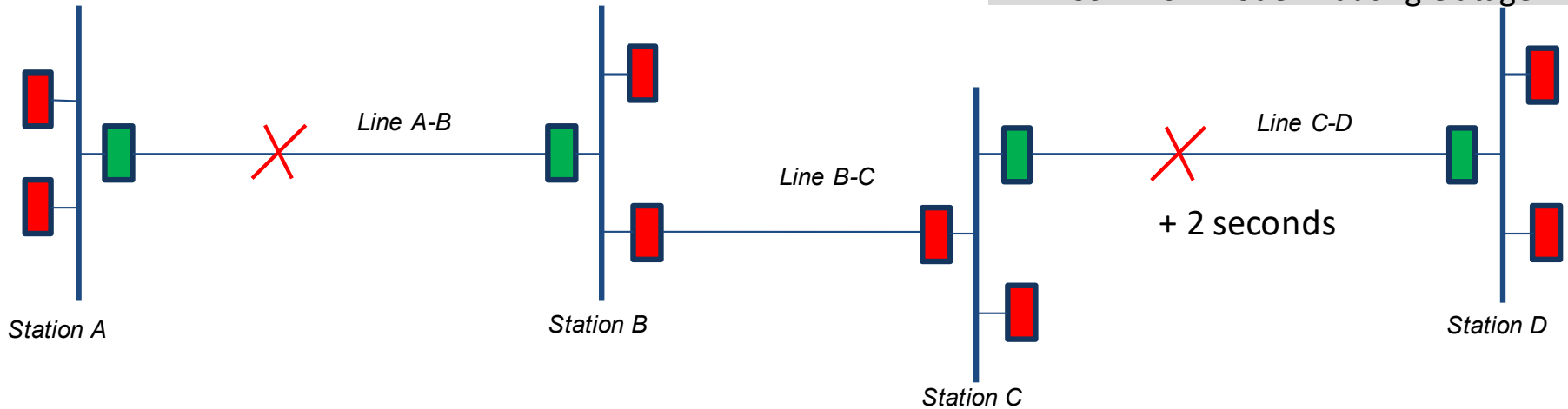
What is the Outage Mode Code for Line C-D?



- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage
- D. Common Mode Outage
- E. Common Mode Initiating Outage

Lightning strikes Line A-B and Line C-D a few seconds apart. They don't share ROW or any equipment. All lines are BES elements.

What is the Outage Mode Code for Line C-D?

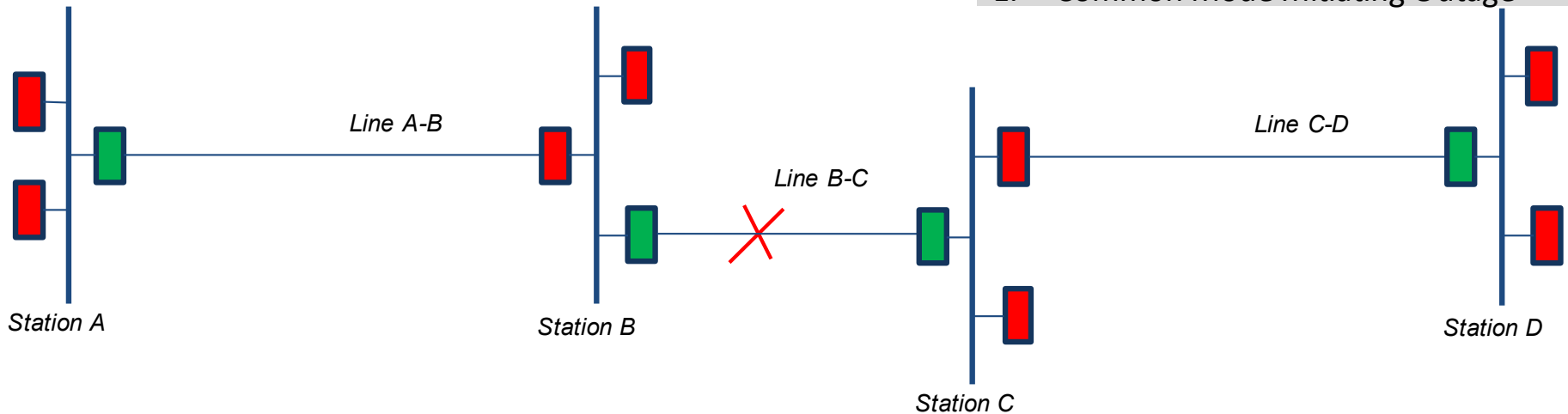


- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage
- D. Common Mode Outage
- E. Common Mode Initiating Outage

Fault on Line B-C. Two separate relay issues (Protection System) at Station A and Station D. All lines are BES elements.

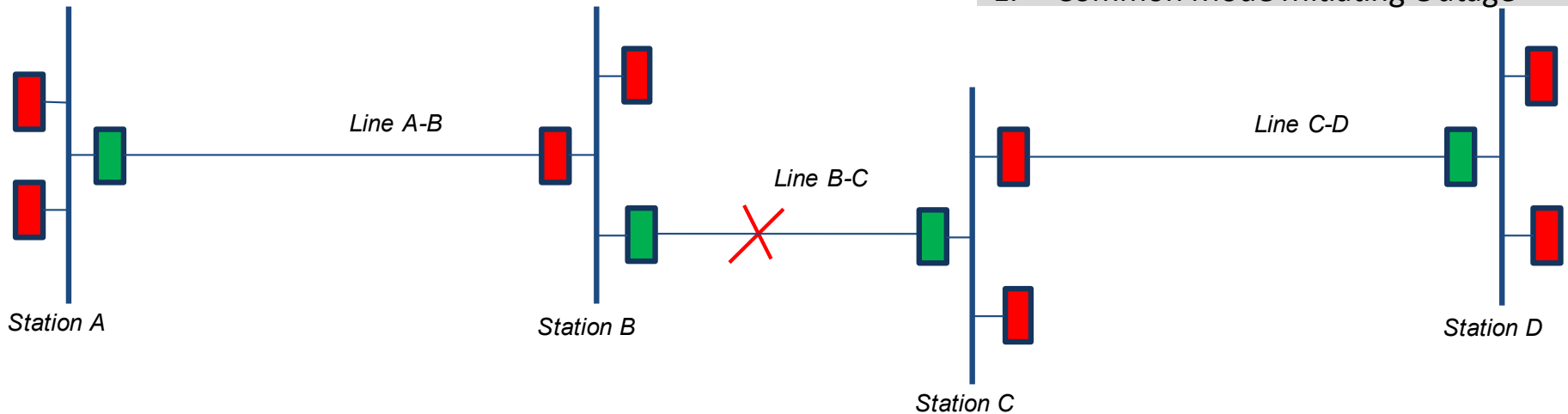
What is the Outage Mode Code for Line B-C?

- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage
- D. Common Mode Outage
- E. Common Mode Initiating Outage



Fault on Line B-C. Two separate relay issues (Protection System) at Station A and Station D. All lines are BES elements.

What is the Outage Mode Code for Line B-C?



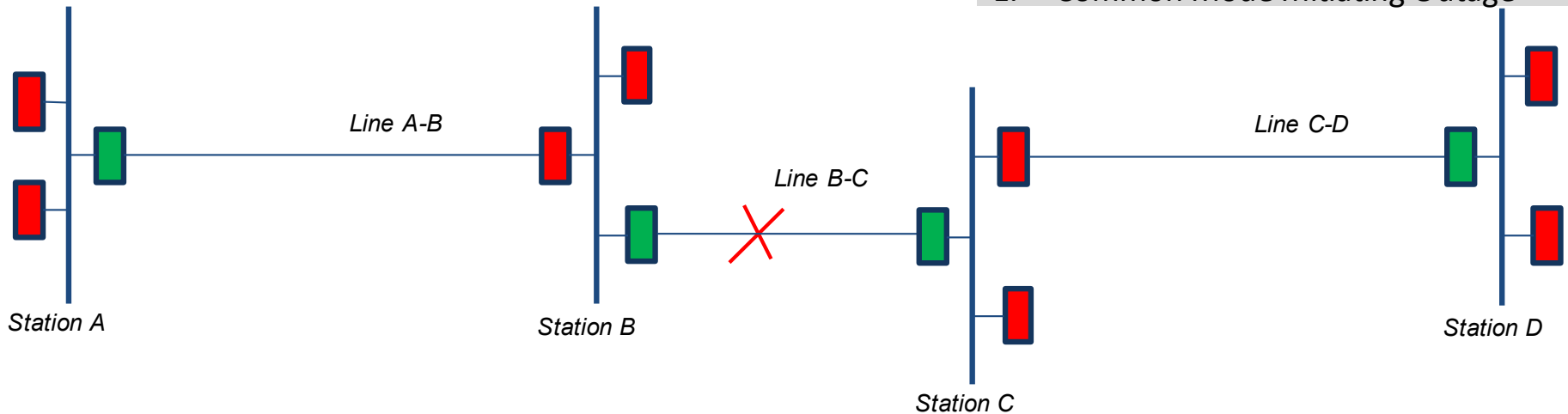
- A. Single Mode Outage
- B. Dependent Mode Initiating Outage**
- C. Dependent Mode Outage
- D. Common Mode Outage
- E. Common Mode Initiating Outage



Fault on Line B-C. Two separate relay issues (Protection System) at Station A and Station D. All lines are BES elements.

What is the Outage Mode Code for Line A-B?

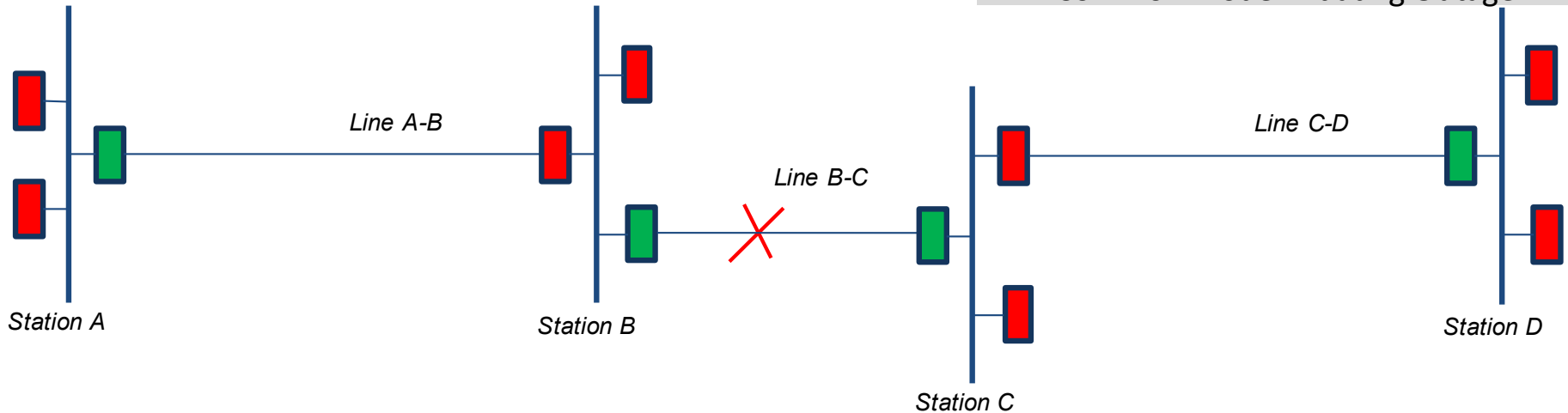
- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage
- D. Common Mode Outage
- E. Common Mode Initiating Outage



Fault on Line B-C. Two separate relay issues (Protection System) at Station A and Station D. All lines are BES elements.

What is the Outage Mode Code for Line A-B?

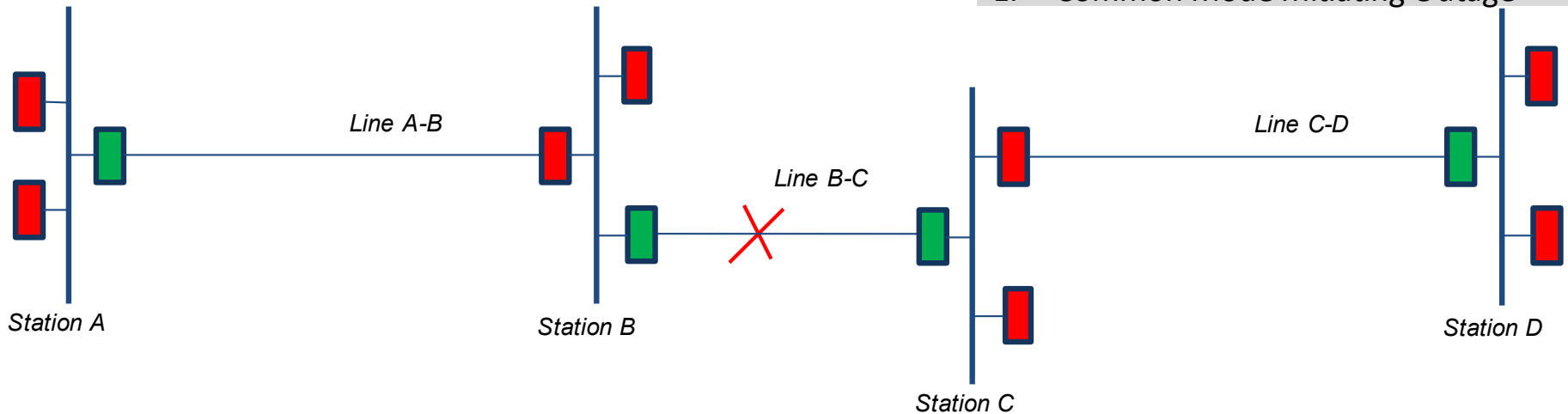
- A. Single Mode Outage
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- D. Common Mode Outage
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Fault on Line B-C. Two separate relay issues (Protection System) at Station A and Station D. All lines are BES elements.

What is the Outage Mode Code for Line C-D?

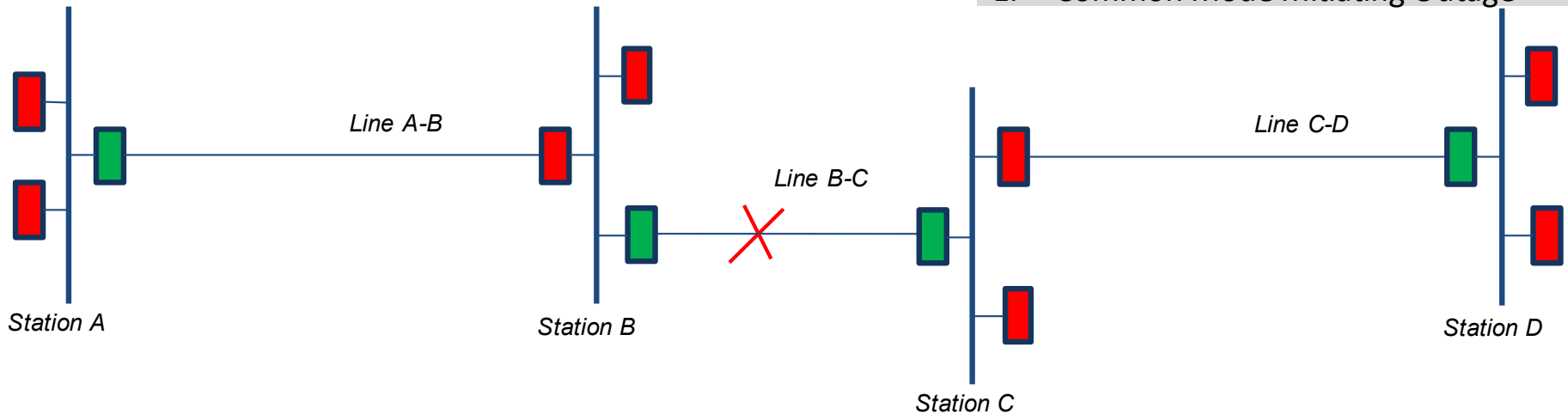
- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage
- D. Common Mode Outage
- E. Common Mode Initiating Outage



Fault on Line B-C. Two separate relay issues (Protection System) at Station A and Station D. All lines are BES elements.

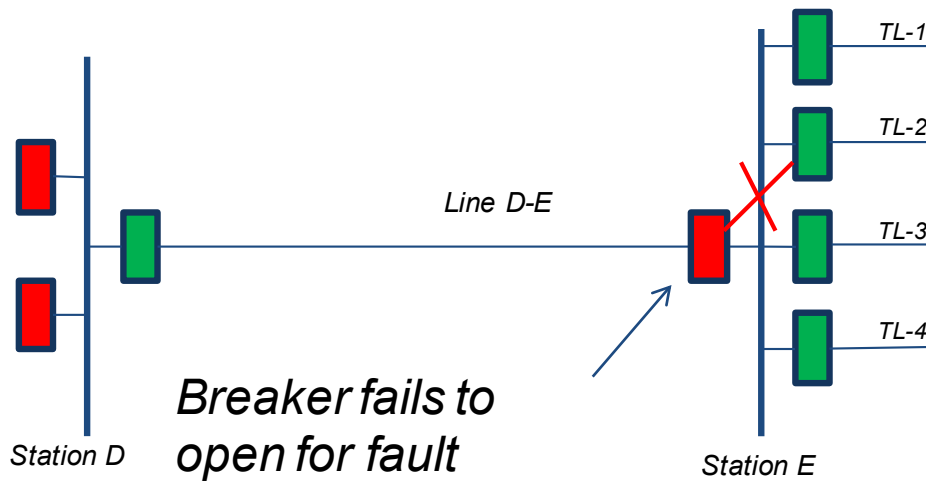
What is the Outage Mode Code for Line C-D?

- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage**
- D. Common Mode Outage
- E. Common Mode Initiating Outage



Bus at Station E has fault. A relay on Line D-E misoperates. All lines are BES elements.

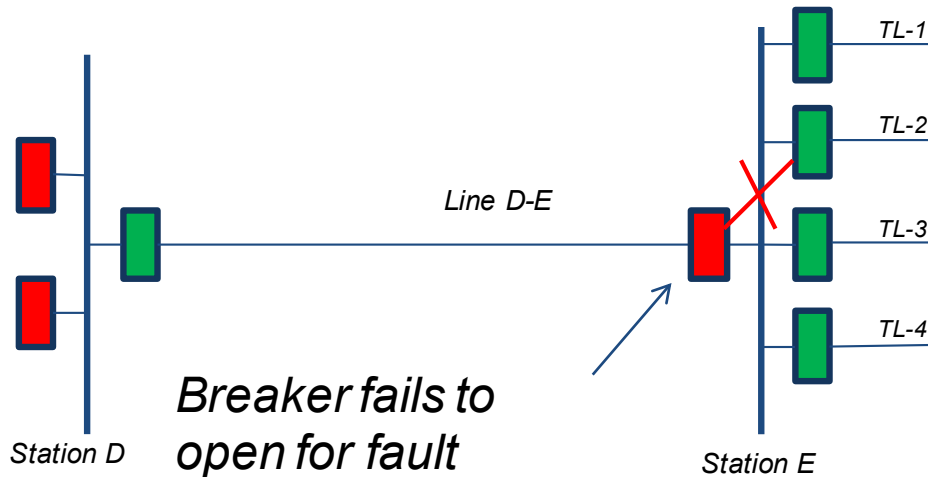
What is the Outage Mode Code for Line D-E?



- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage
- D. Common Mode Outage
- E. Common Mode Initiating Outage

Bus at Station E has fault. A relay on Line D-E misoperates. All lines are BES elements.

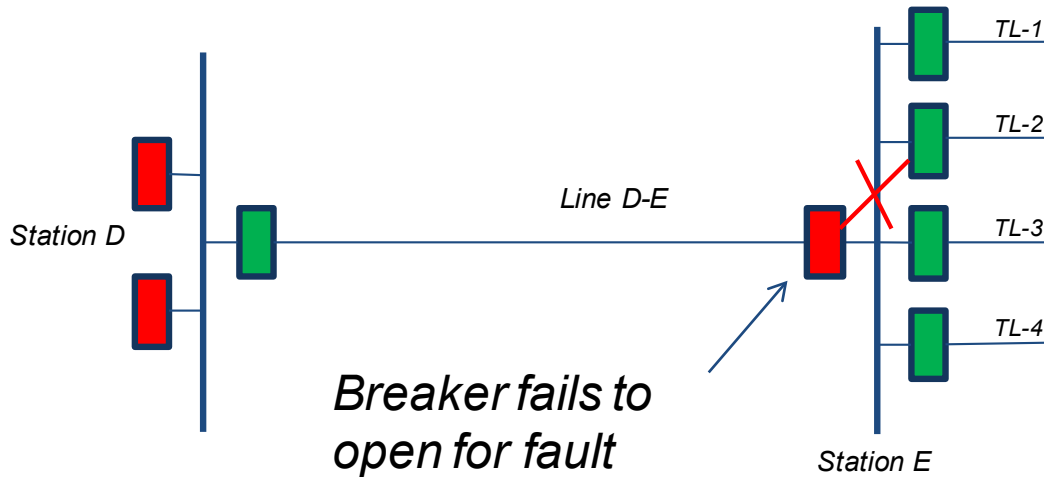
What is the Outage Mode Code for Line D-E?



- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage
- D. Common Mode Outage**
- E. Common Mode Initiating Outage

Bus at Station E has fault. A relay on Line D-E misoperates. All lines are BES elements.

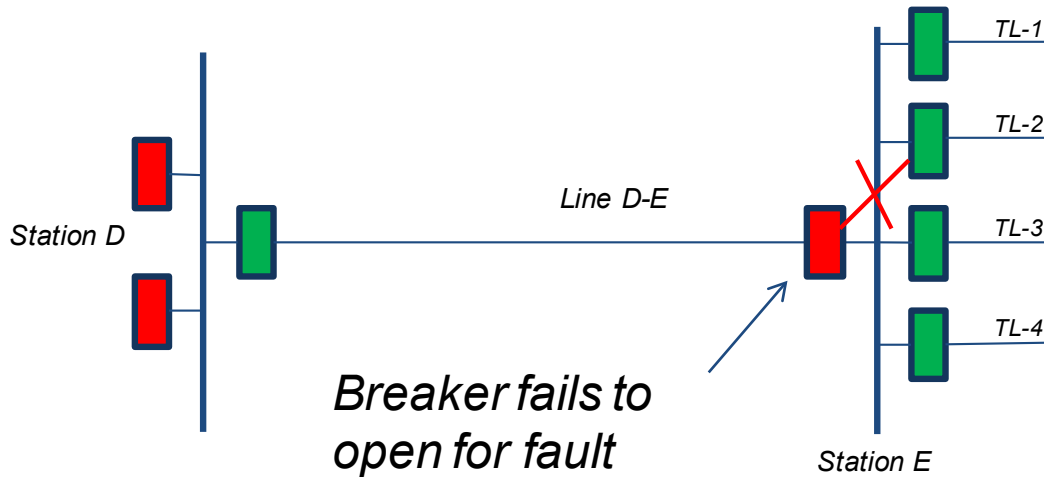
What is the Outage Mode Code for lines TL-1, TL-2...?



- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage
- D. Common Mode Outage
- E. Common Mode Initiating Outage

Bus at Station E has fault. A relay on Line D-E misoperates. All lines are BES elements.

What is the Outage Mode Code for lines TL-1, TL-2...?



- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage
- D. Common Mode Outage**
- E. Common Mode Initiating Outage





# Questions and Answers

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