

# NERC Lessons Learned

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Mixing Relay Technologies in  
Directional Comparison Blocking  
Schemes



Midwest Reliability Organization



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- Mixing protective relay technologies at the remote terminals of DCB schemes has caused multiple misoperations
- An electromechanical (E-M) relay system and microprocessor ( $\mu$ P) relay system mix is especially challenging

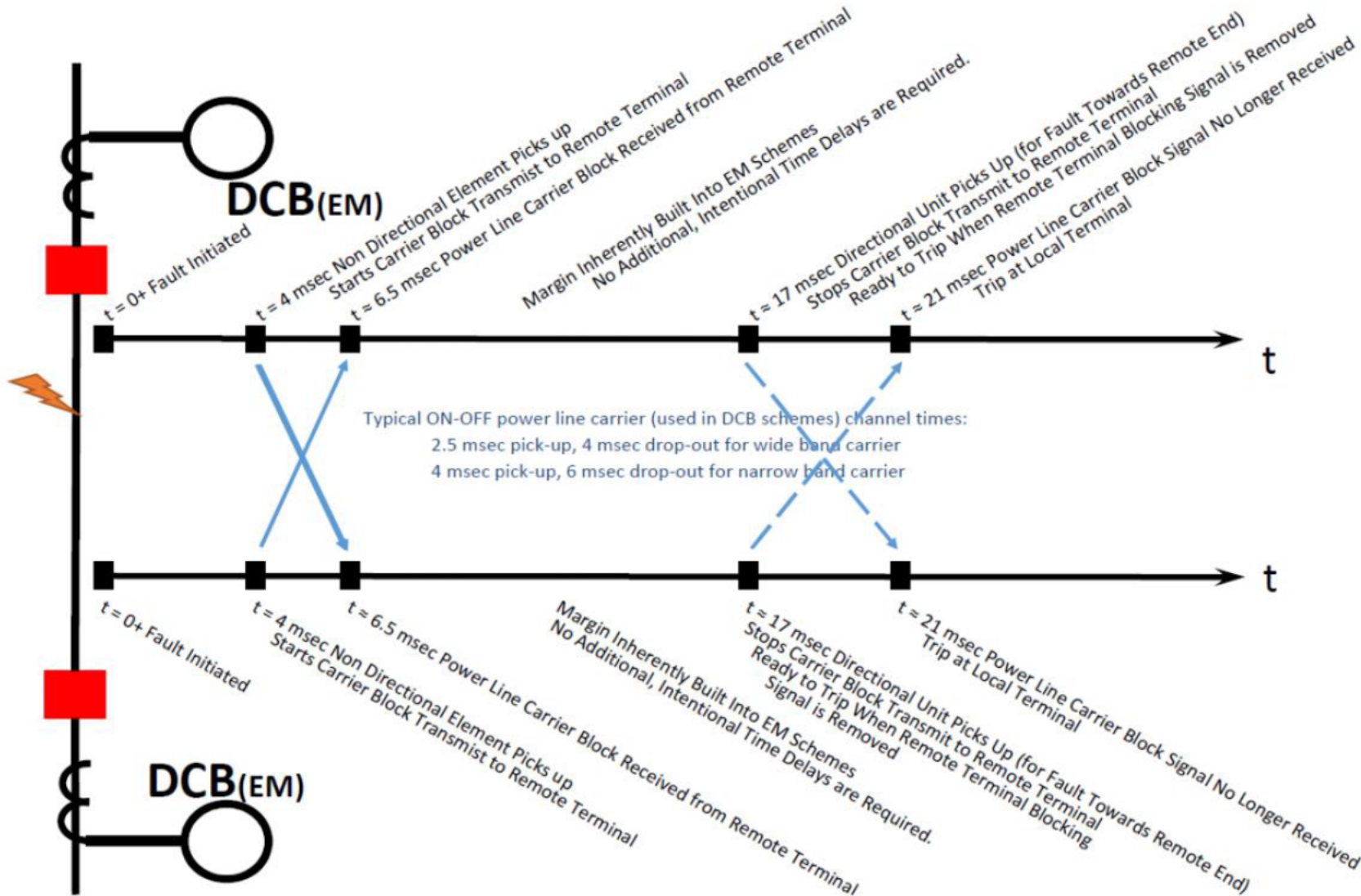


Figure 1: Approximate Timing Associated with a typical EM DCB schemes [1]

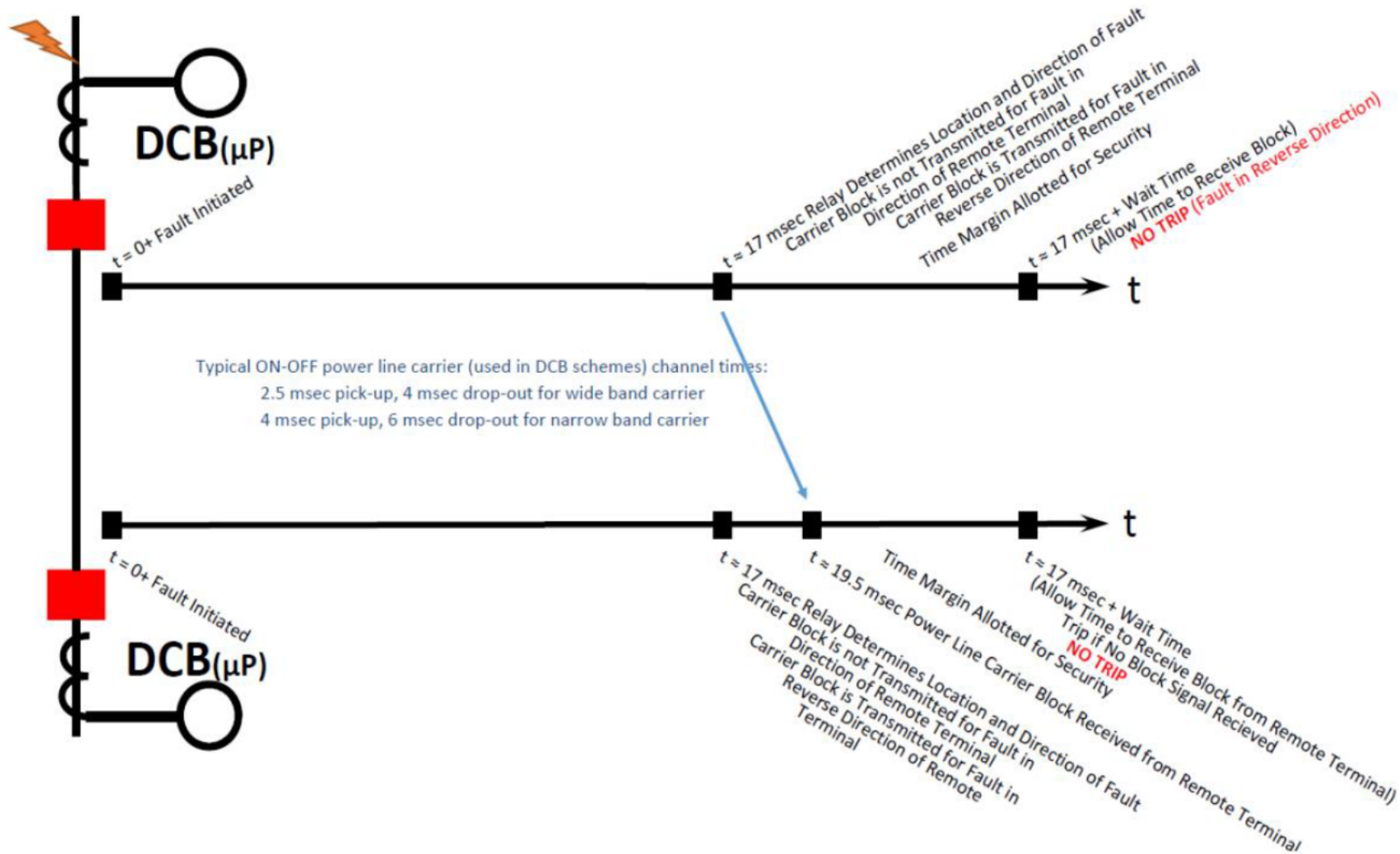


Figure 2: Approximate Timing Associated with typical  $\mu$ P DCB Schemes [1]

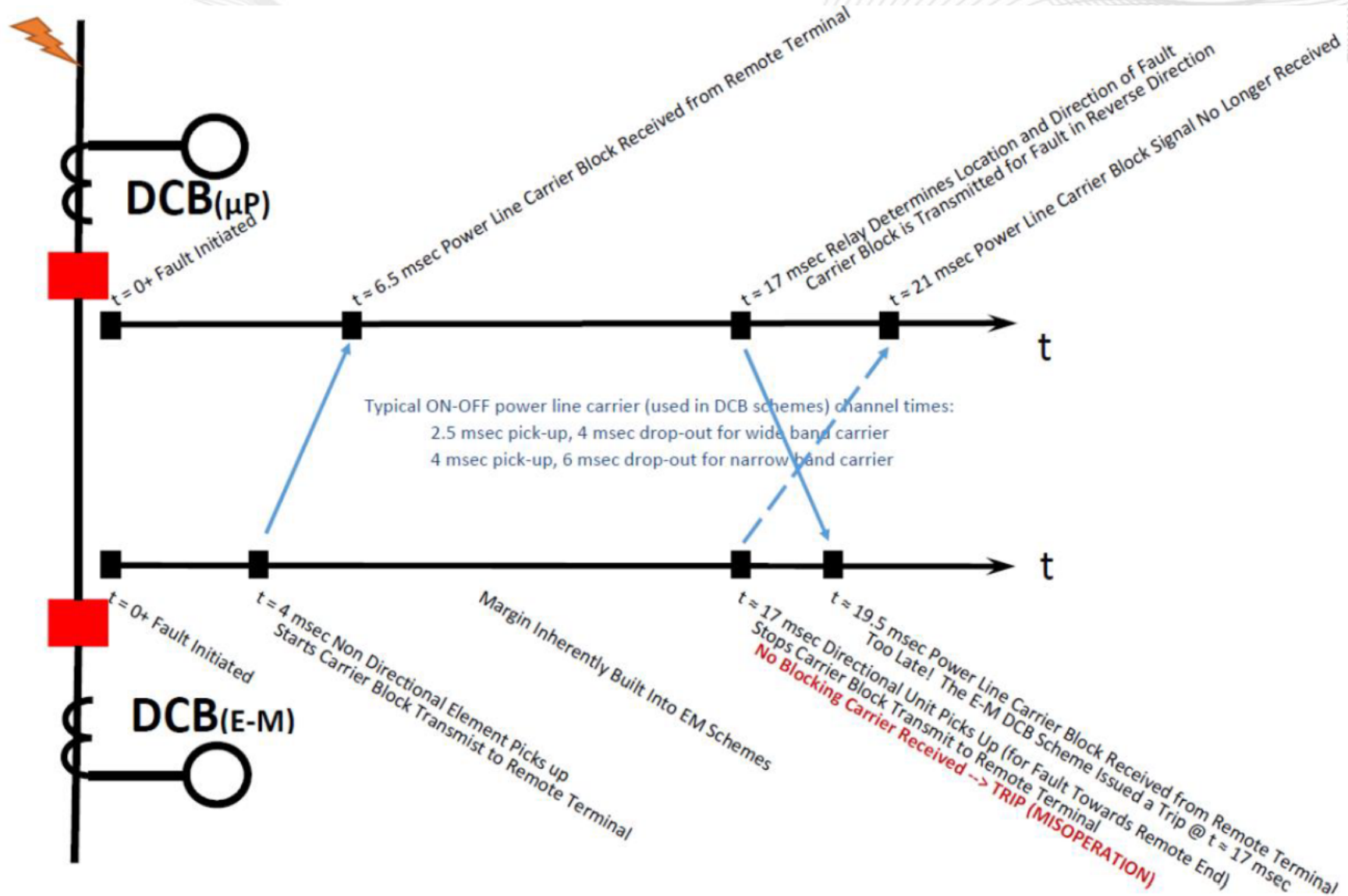


Figure 3: Timing Demonstrated with Mixing EM and  $\mu$ P Technologies [1]

- Avoid mixing relay technology in directional comparison blocking (DCB) schemes
- Work with neighboring entities to eliminate the mixing relay technologies at ties
- If unable to avoid mixing relay technologies in DCB schemes, utilize the mitigation steps for multiple composite protection schemes

1. Mixing Relay Technologies in Directional Comparison Blocking Schemes  
[https://www.nerc.com/pa/rrm/ea/Lessons%20Learned%20Document%20Library/LL20200701\\_Mixing\\_Relay\\_Technologies\\_in\\_DCB\\_Schemes.pdf](https://www.nerc.com/pa/rrm/ea/Lessons%20Learned%20Document%20Library/LL20200701_Mixing_Relay_Technologies_in_DCB_Schemes.pdf)



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## NERC Lessons Learned



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