The ACLT as a Cable Design Aging Test

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Approach

- **Use basic ACLT Testing Procedure**
- **Use complete cable designs**
  - **Moisture blocked conductors**
  - **Jackets**
  - **Moisture barriers (if appropriate)**
- **35 foot sample coils**
- **12 replicates per design**

Accelerated Aging Tests

- Traditional Cable Tests (Wet Conductor and No Jacket)
  - Conductor temperatures = 50 to 90°C
  - Aging voltage = 3 to 4 times rated
  - Conductor = 1/0 AWG unfilled
  - Insulation = 175 mils
- Results
  - XLPE fails early and often (GMTF = 58 to 179 days)
  - EPR fails later and less often (GMTF > 1500 days)
  - EPRI RP 2713-02

Accelerated Aging Tests

- Non-Traditional Cable Tests
  (Dry Conductor With A Jacket)
  - Conductor temperatures = 90°C
  - Aging voltage = 3.6 times rated
  - Conductor = 1/0 AWG (solid or filled strand)
  - Insulation = 260 and 345 mils
- Results
  - XLPE fails occasionally
  - Some EPR fails more often
  - Georgia Power Project 86-045

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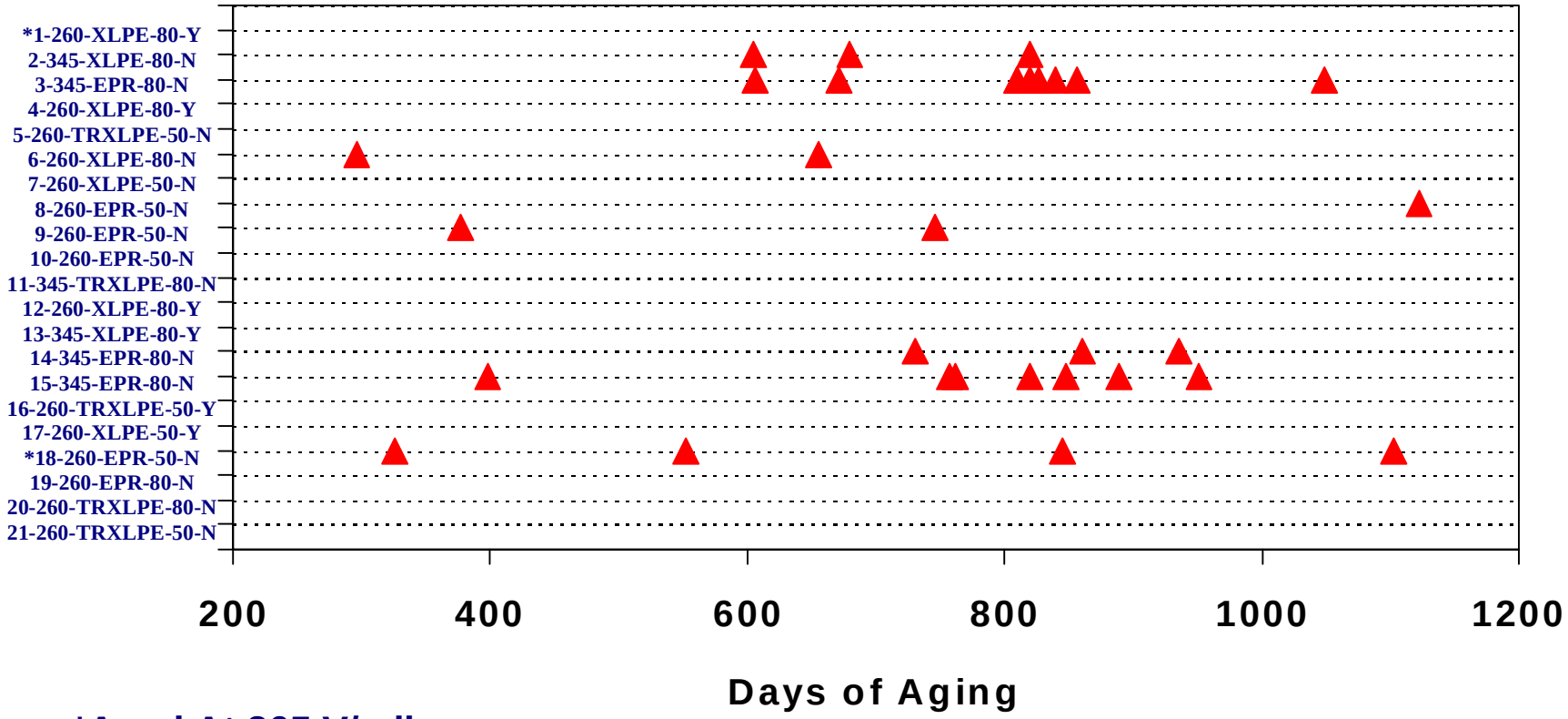
Aging Failures
Cable Design Aging Test
XLPE, TR-XLPE, EPR
Aged at 200 V/mil Unless Otherwise Noted



***Aged At 265 V/mil**

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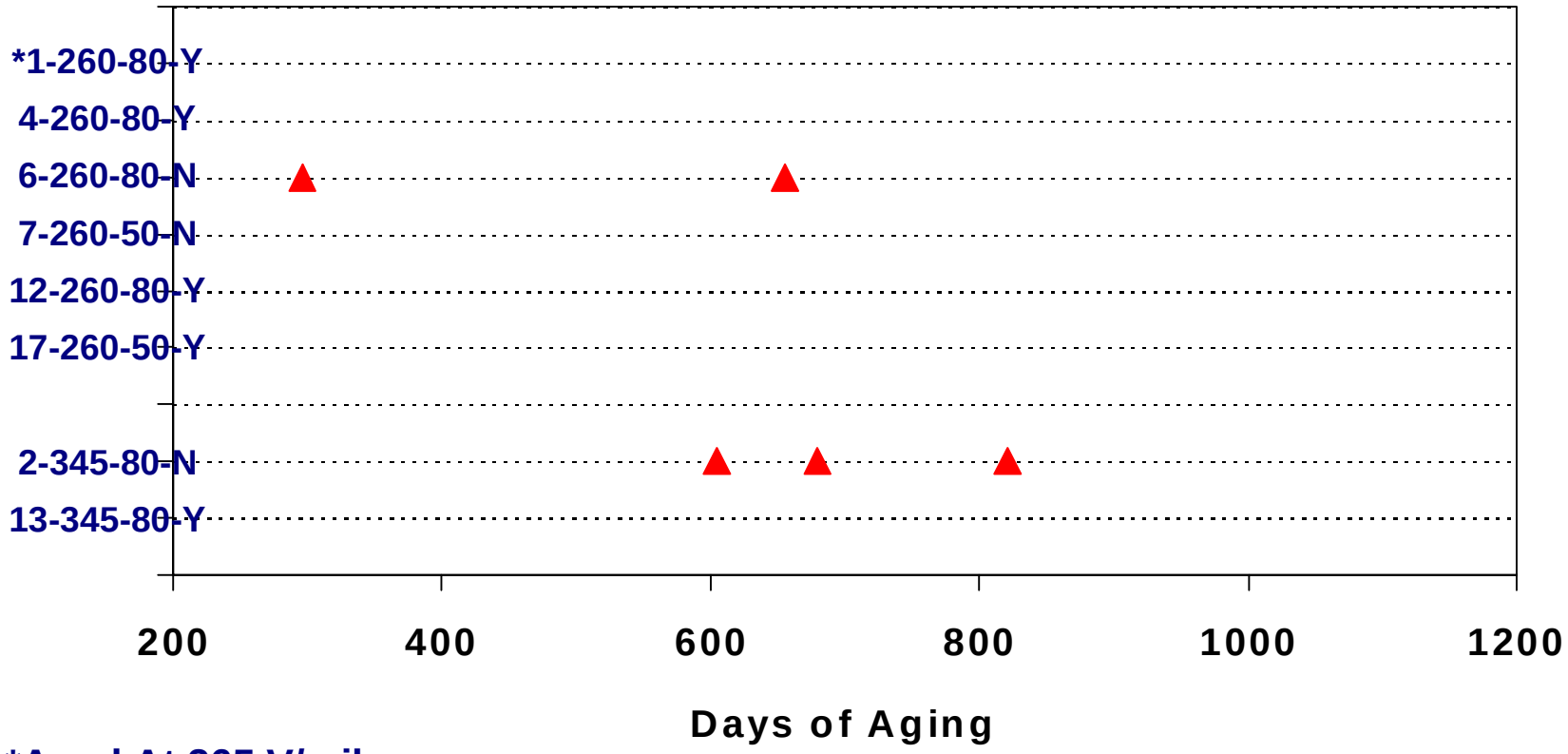
Aging Failures
Cable Design Aging Test
XLPE
Aged at 200 V/mil Unless Otherwise Noted



*Aged At 265 V/mil

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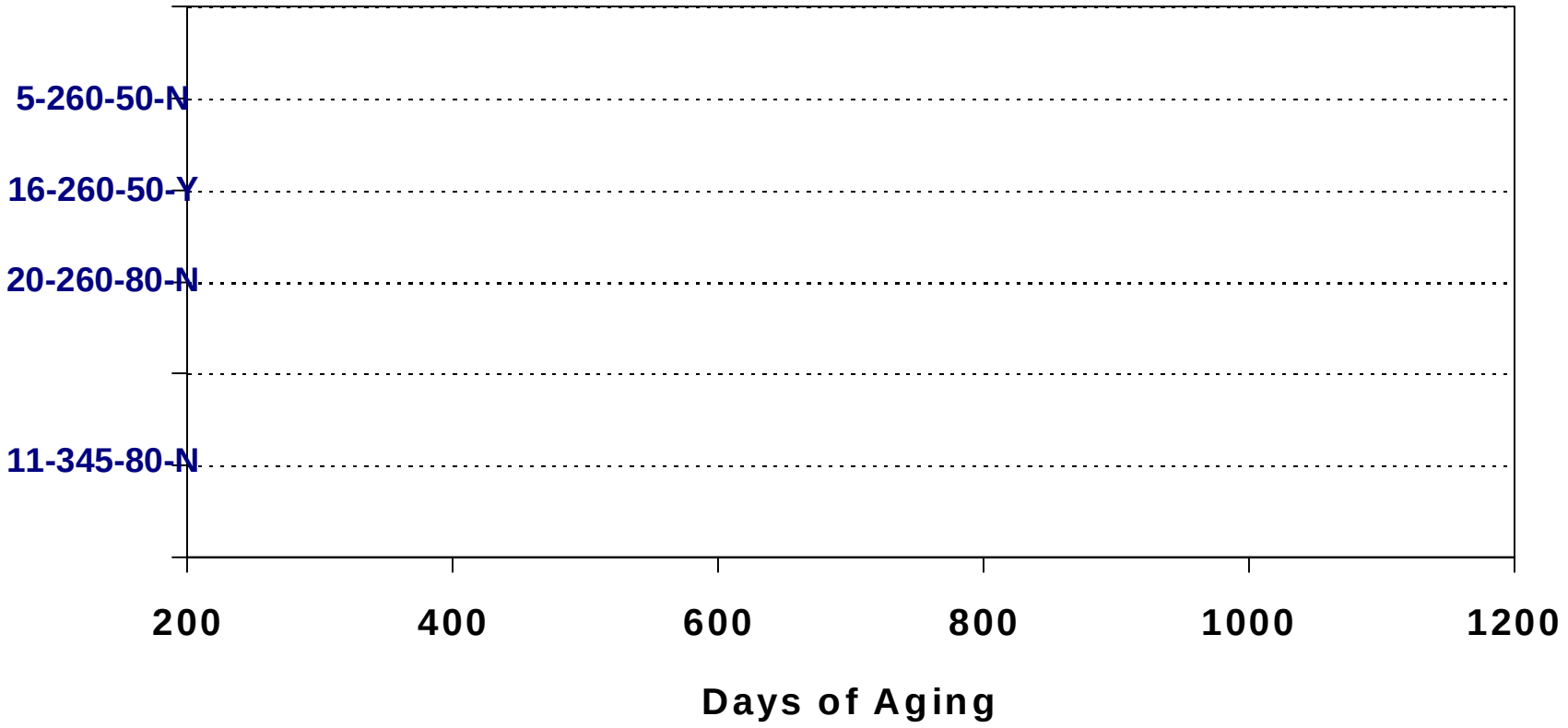
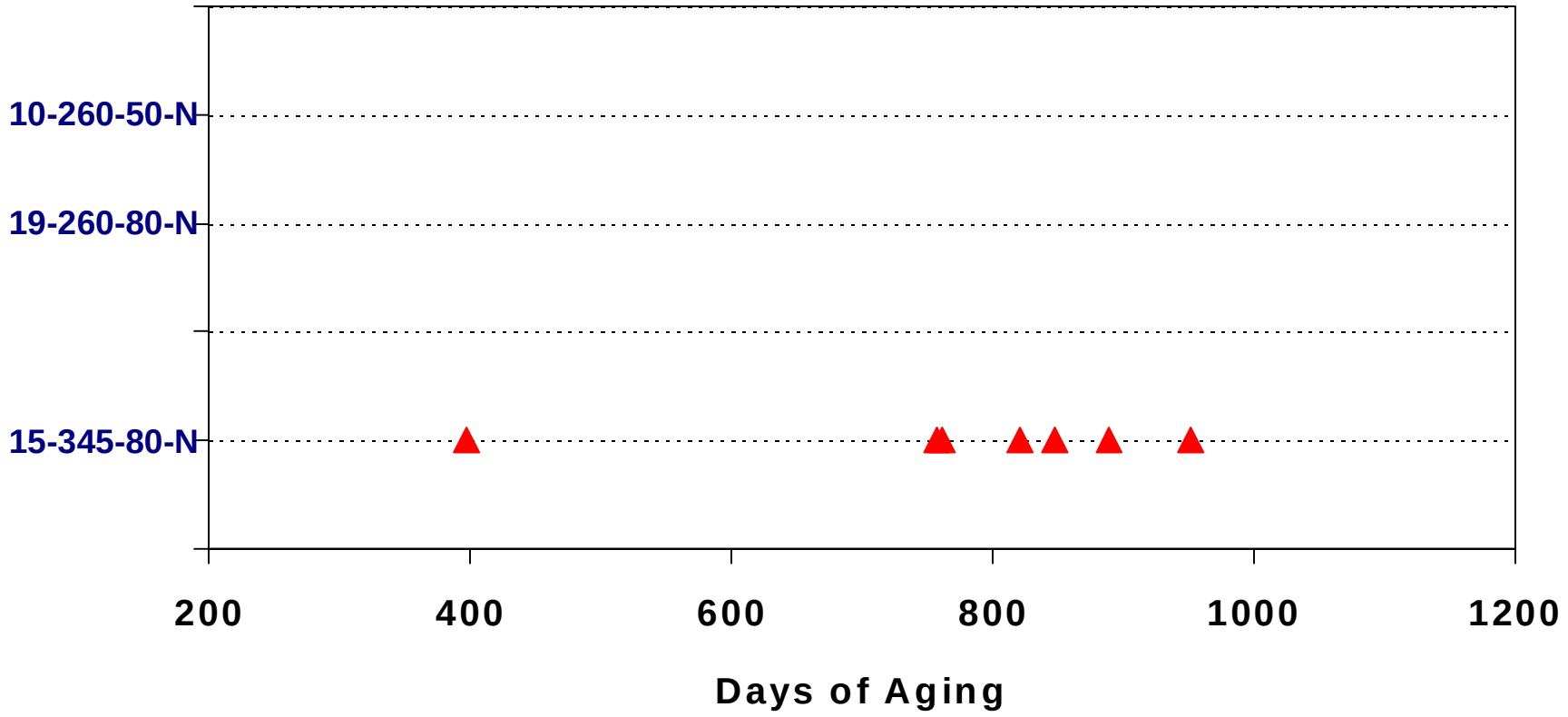
Cable Design Aging Test
TRXLPE



Aging Failures
Cable Design Aging Test
EPR 1
Aged at 200 V/mil



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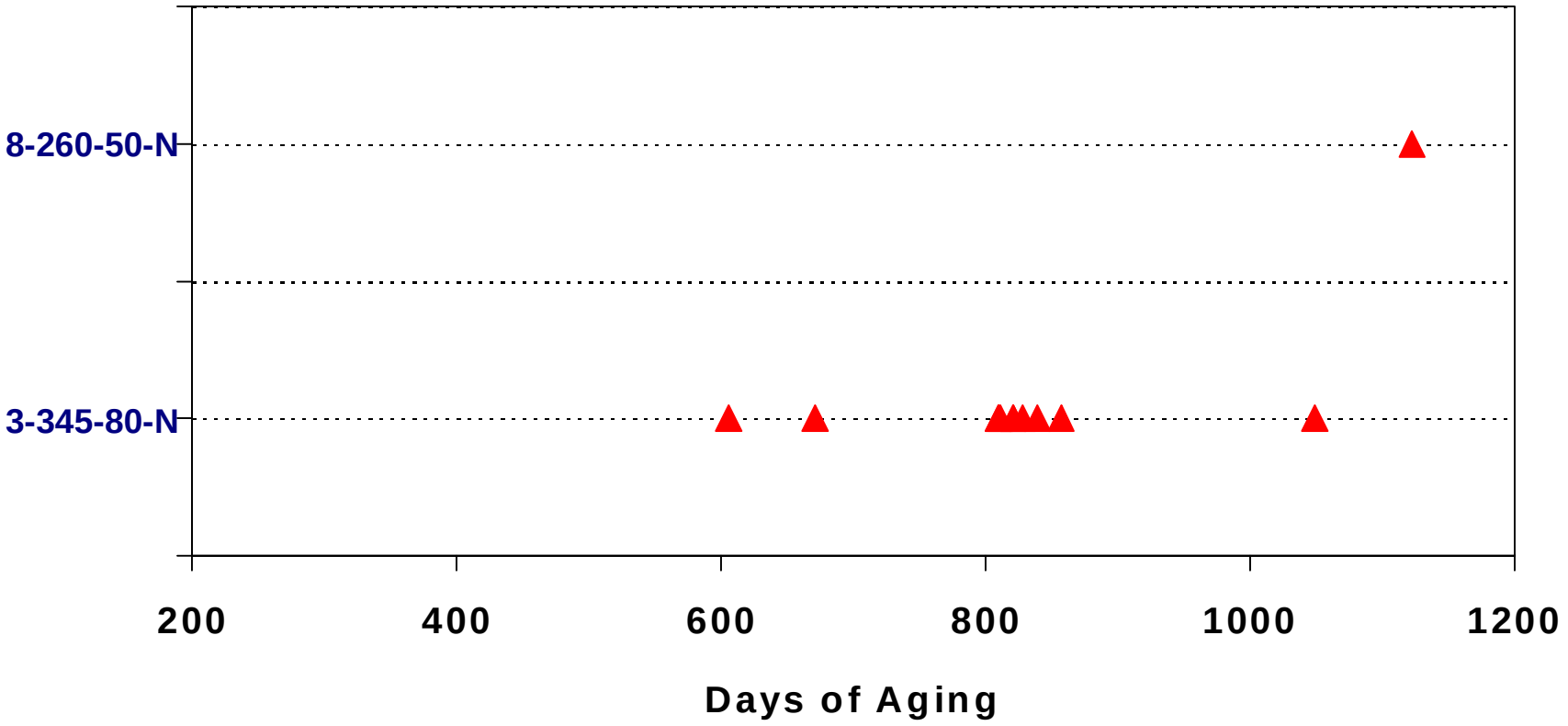
Aging Failures
Cable Design Aging Test
EPR 2
Aged at 200 V/mil



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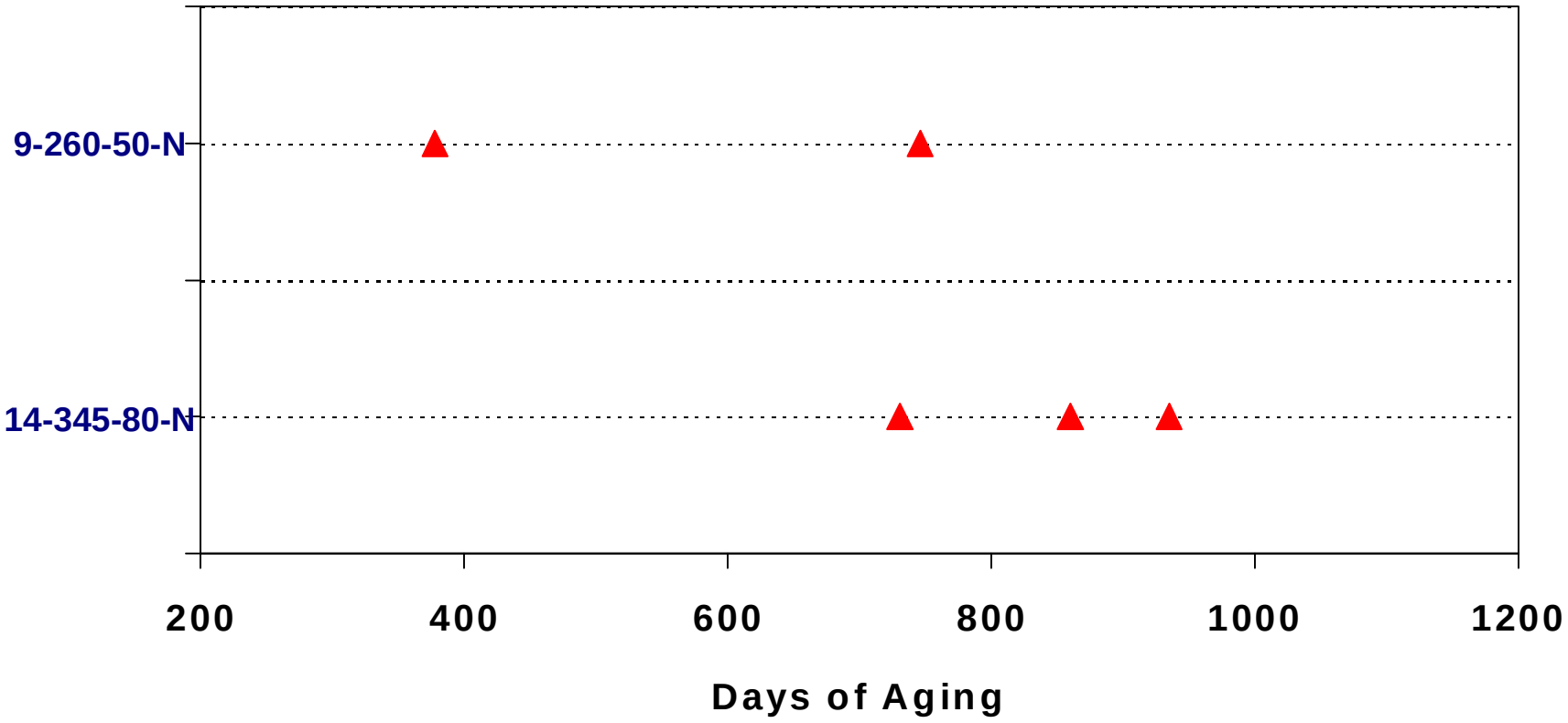
Aging Failures
Cable Design Aging Test
EPR 3
Aged at 200 V/mil



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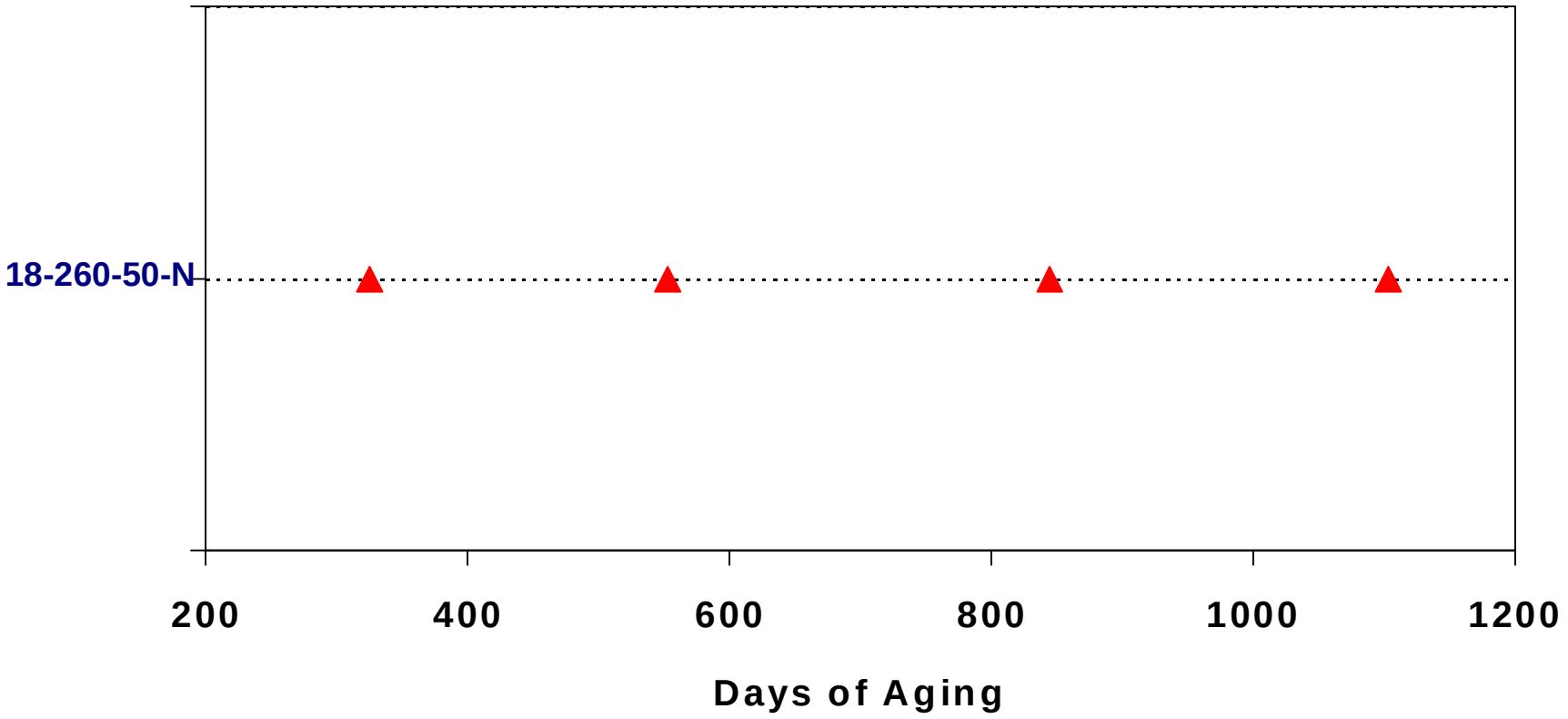
Aging Failures
Cable Design Aging Test
EPR 4
Aged at 265 V/mil



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Accelerated Aging Tests
Comments

- XLPE and EPR respond differently to different conditions
- Dry conductors and jackets increase XLPE cable life
- Delayed moisture ingress may reduce EPR cable life
- Tests on Complete Cable Designs Can Yield Different Results than Tests on Cable Cores