Safety Criteria and Protection Limits

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Safety Criteria for Design.

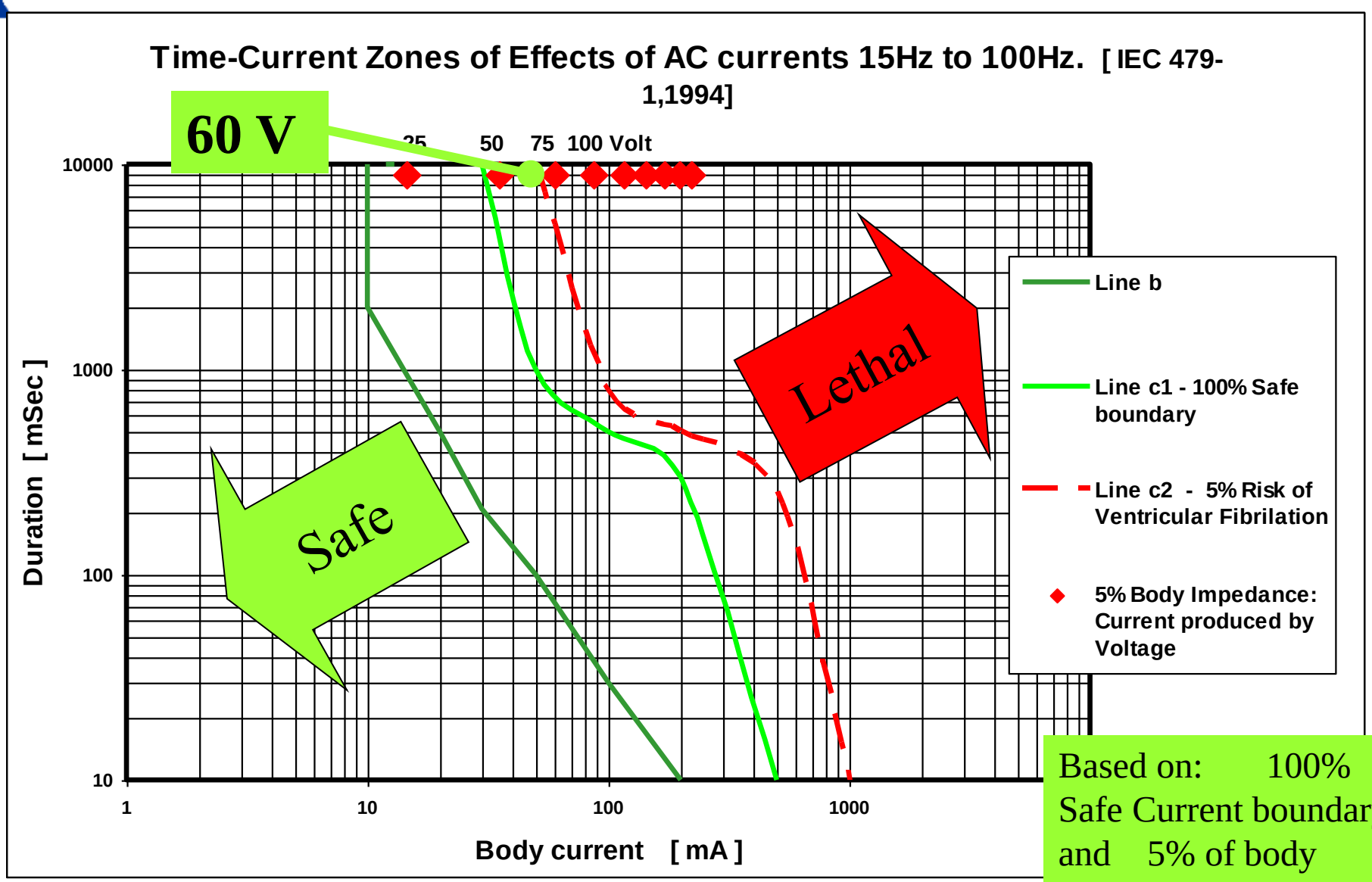
SA Safety Act Requirement:

- **As far as "practicable" be automatically isolating the power supply in the event of a fault developing on the installation or power line.**

- **Precedent-norm:**

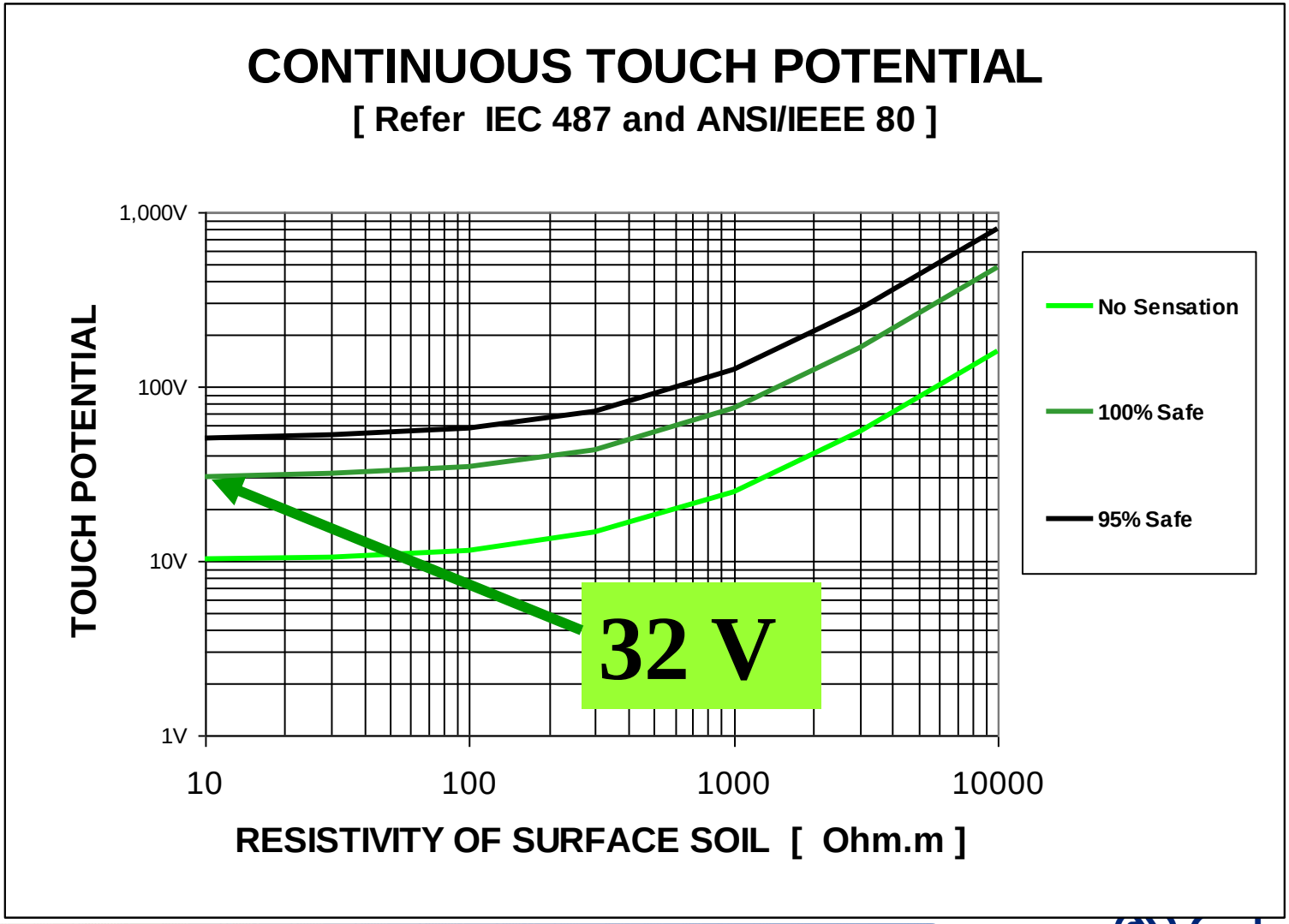
Existing 11 and 22 kV lines

AC Voltage Safety / Deadliness

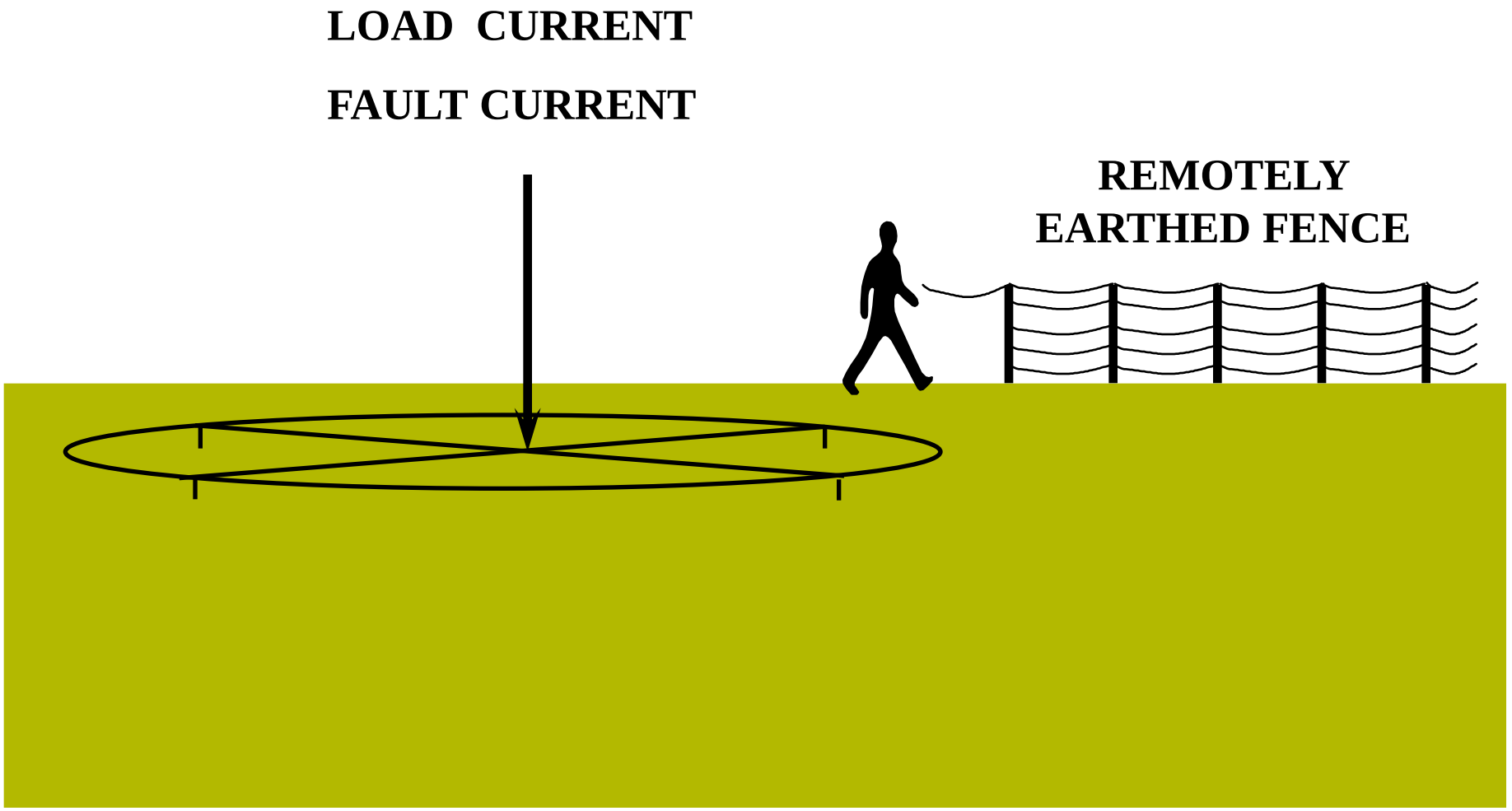


Based on: 100% Safe Current boundary and 5% of body resistance

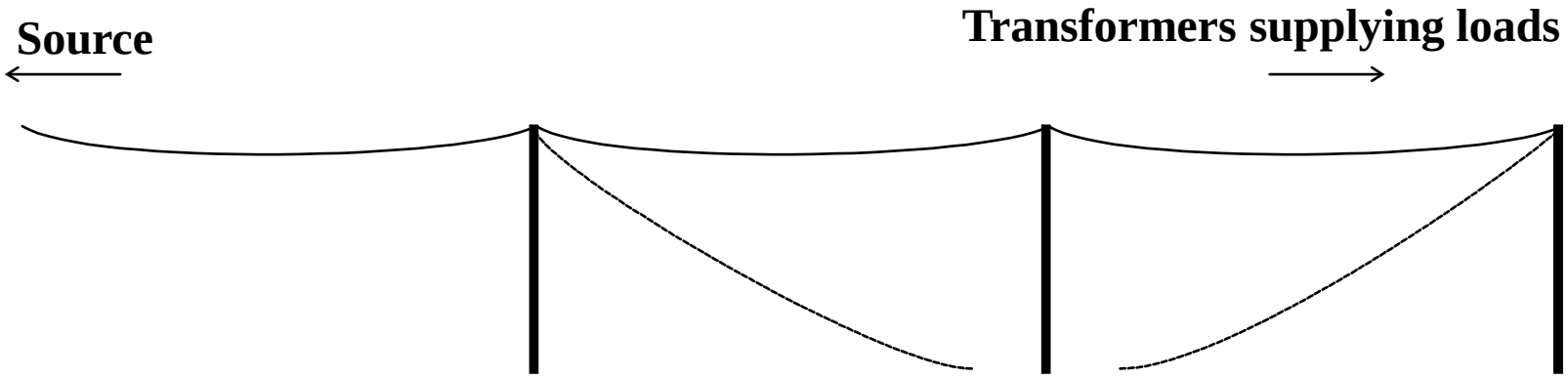
Continuous Touch Potential Including Soil Resistivity



Touch Potential around a SWER Earth



Broken conductors



	Conductor Fallen on the Ground	
System	Supply Side	Load Side
Two, Three phase 6.6 to 33kV	Sensitive Earth Fault protection	Back feed through load: No protection
19.5 kV SWER	Over current Protection	No supply- Safe

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Protection approach for SWER and 3 phase 33 kV system

- Line design done to minimize conductor breaking probability
- Vertical construction for 3 phase lines, upper conductor breakage cause phase to phase fault
- Under running neutral is recommended in dense urban areas for SWER lines
- Public notification: All conductors on the ground dangerous

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Under Running SWER Earth

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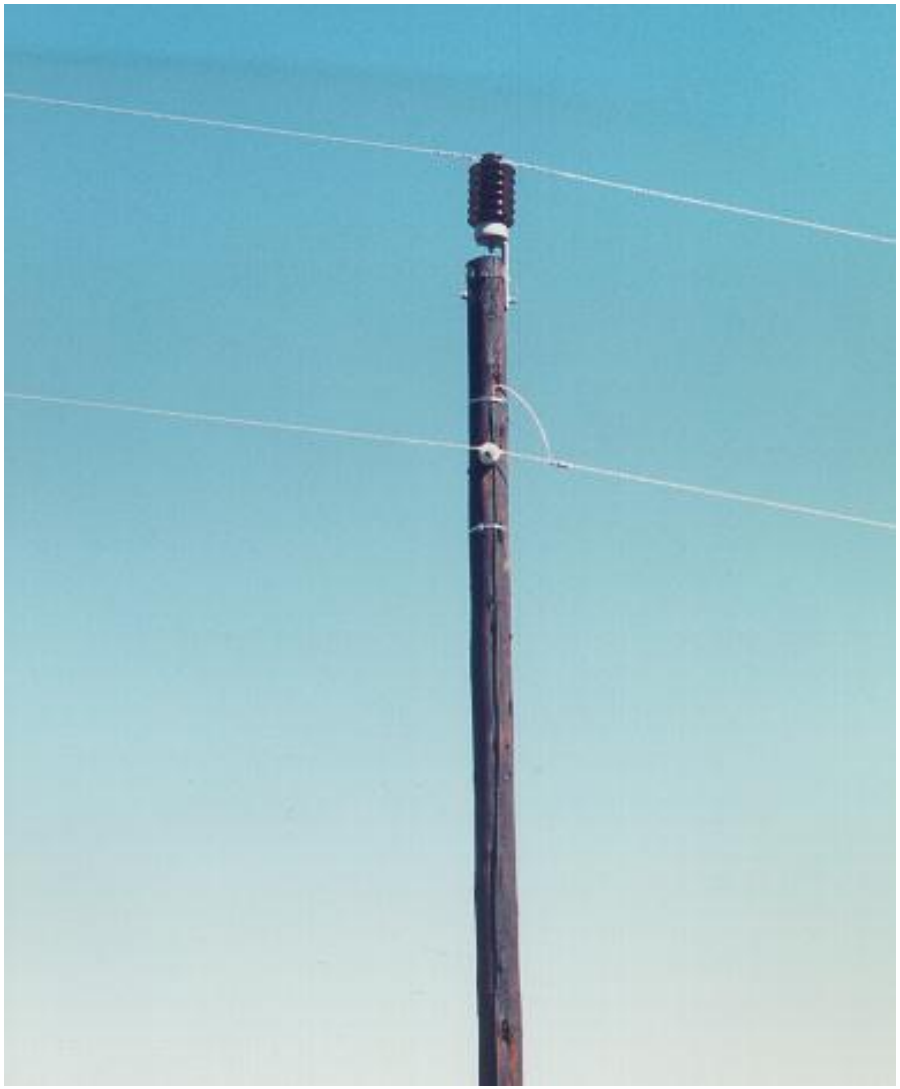
Under Running SWER Earth



Public Education and Warning

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Multiple Circuit Restriction

As a general principle with more than one SWER circuit running on the same pole:

- **It may not be run on a common pole if the source of the feeders are not ganged together and it is not possible to have the one line live while the other is considered to be dead.**

- **(This rule is made due to the risk that two and thee circuit multiple lines could be mistaken for single and three phase MV lines and an operator may think that both lines are dead where as one of the lines may not be switched off.**

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End