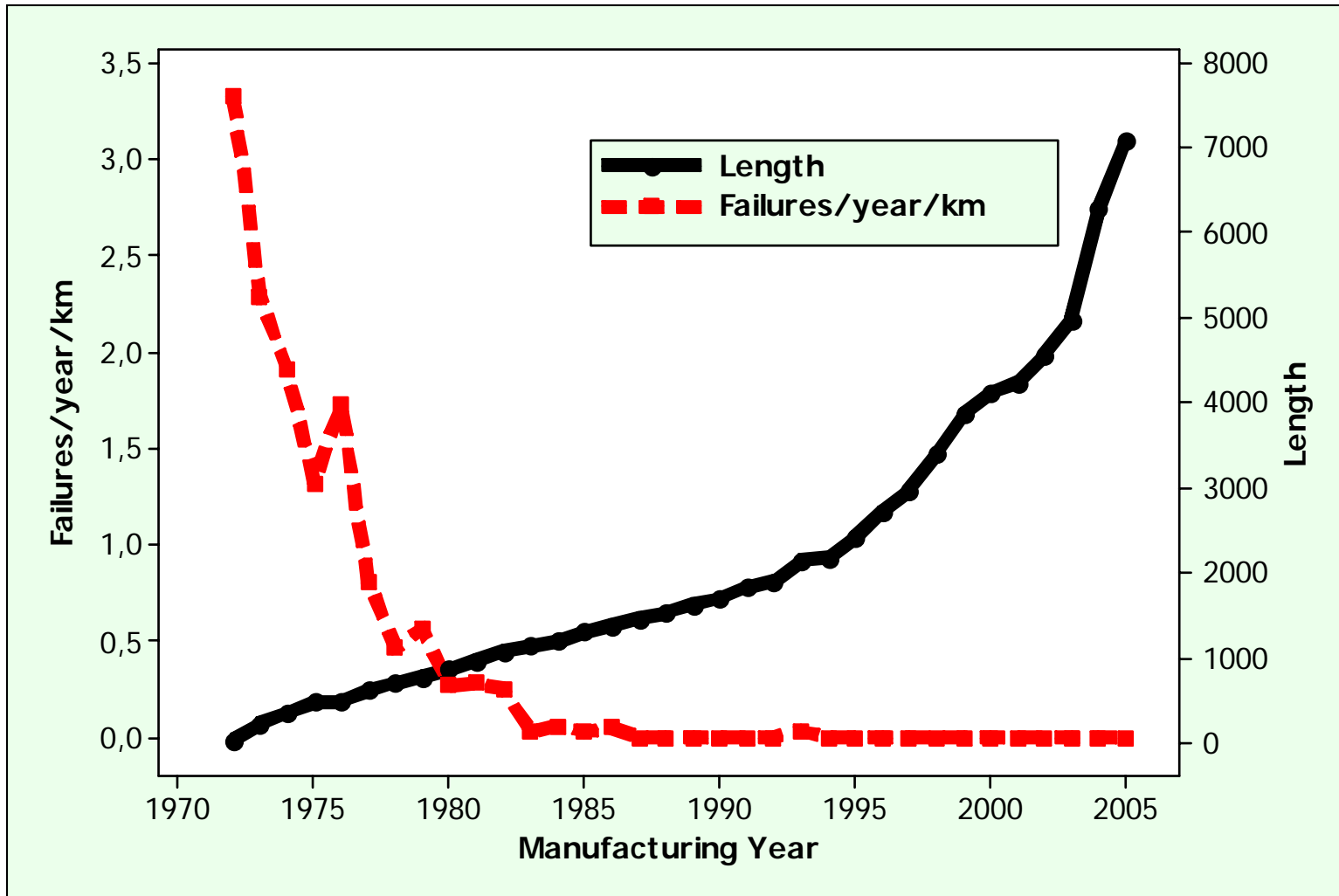


PERFORMANCE OF MODERN CABLES IN CENTRAL EUROPE

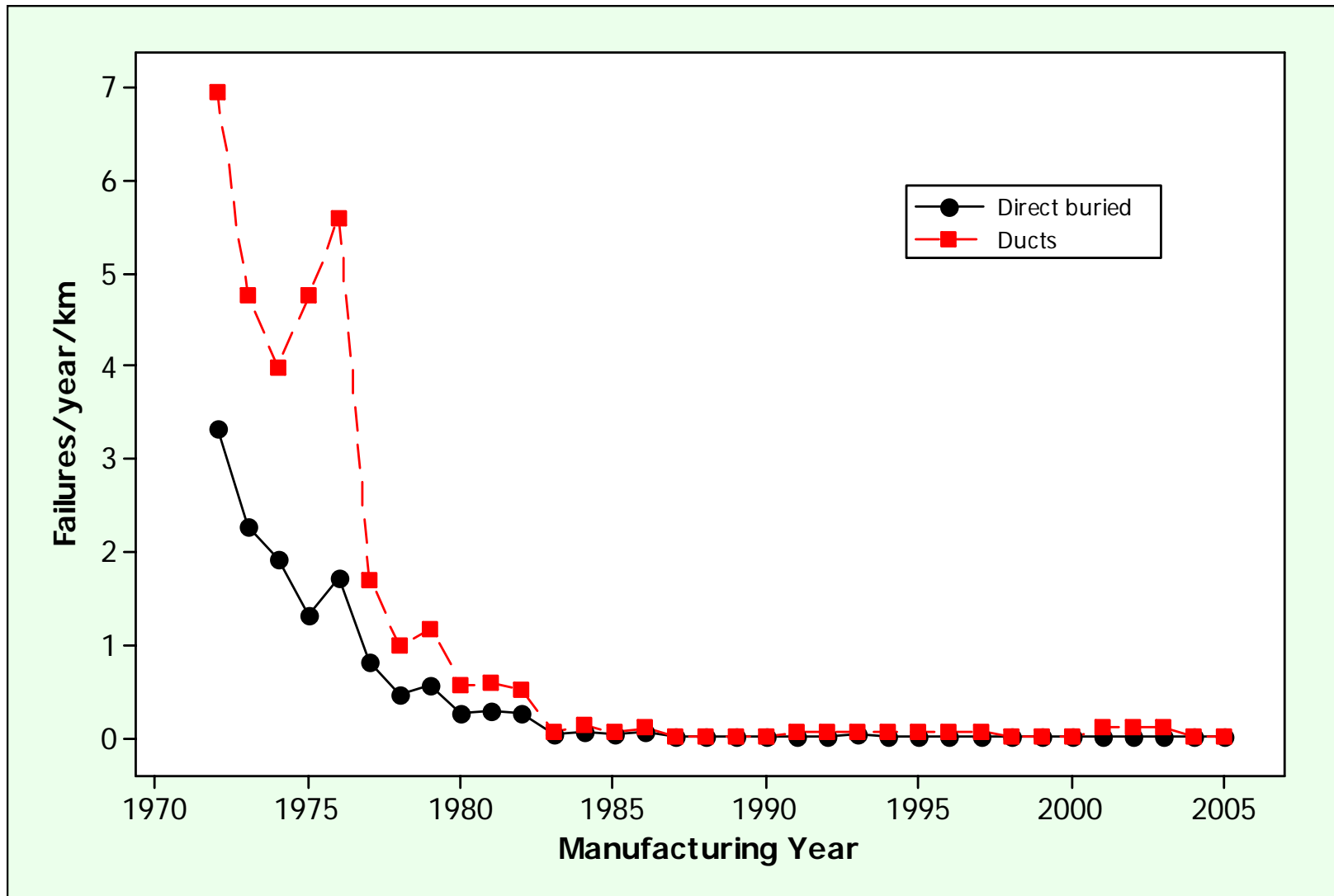
Detlef Wald
Borealis Polymers NV

Presentation of the JiCable paper 2007, Co-Author A. Smedberg

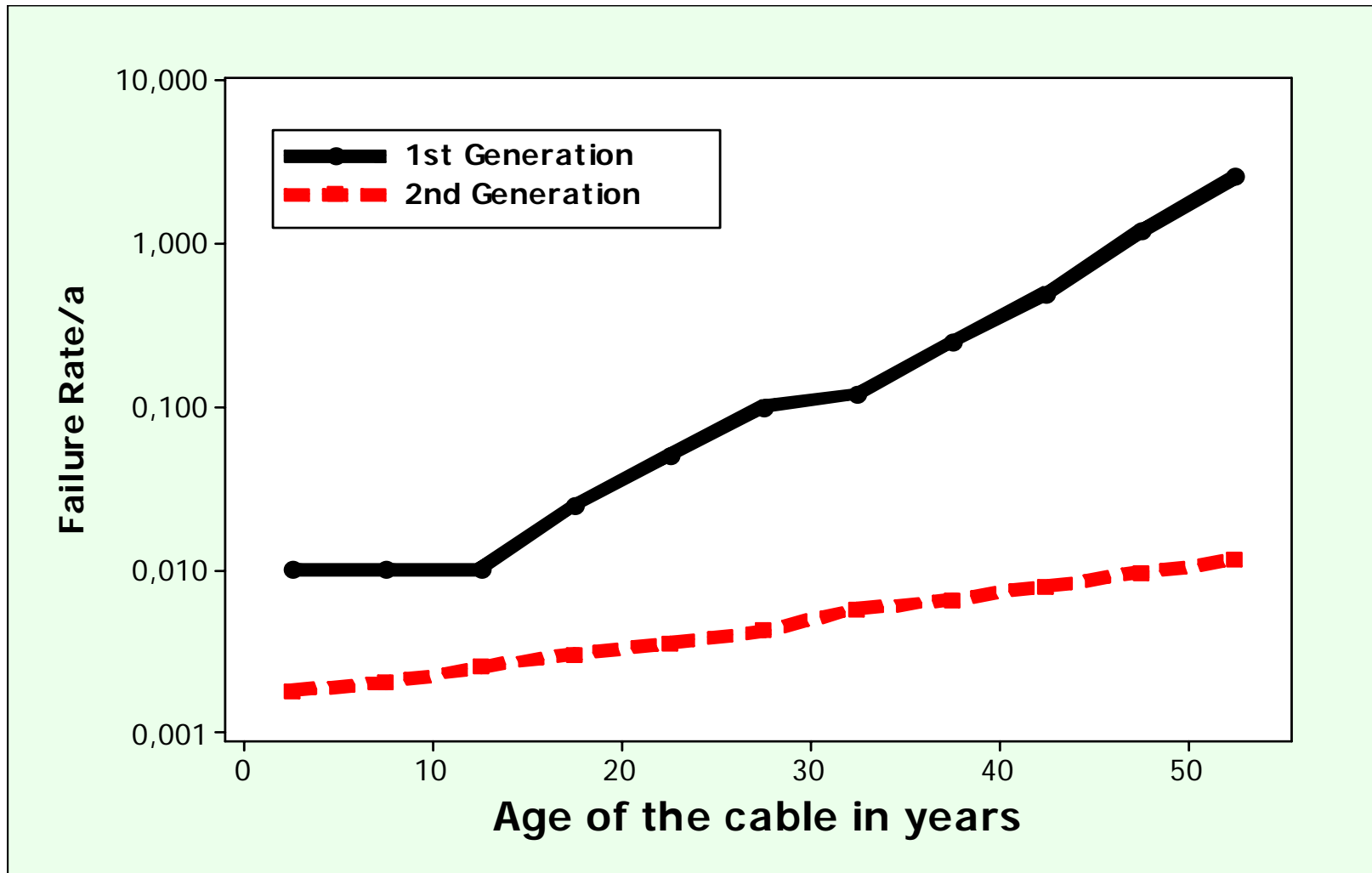
Cable failures at one selected utility



Comparison of laying technique



Failure rate per year

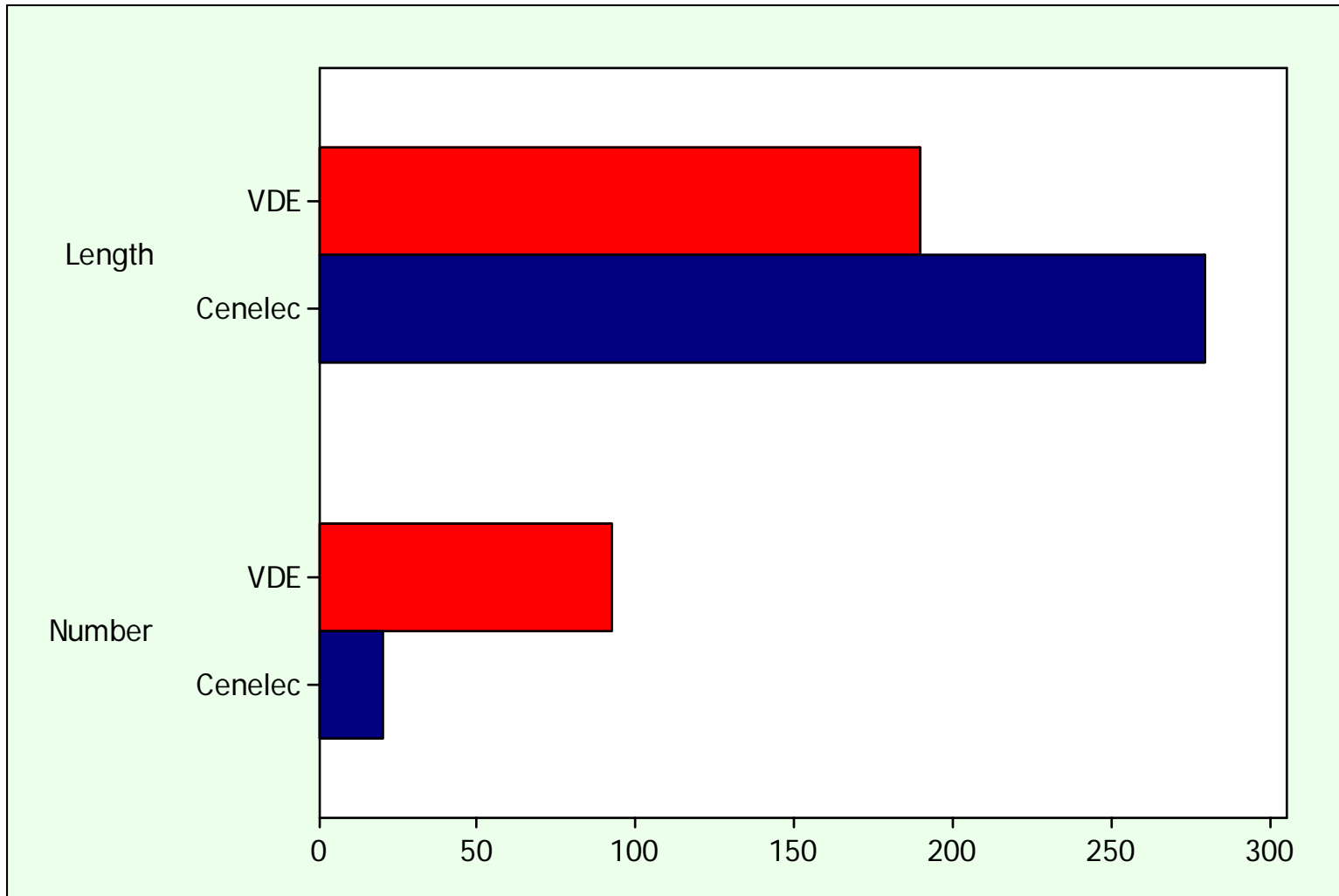


Technischer Bericht 299, "Asset-Management von Verteilungsnetzen", FGH

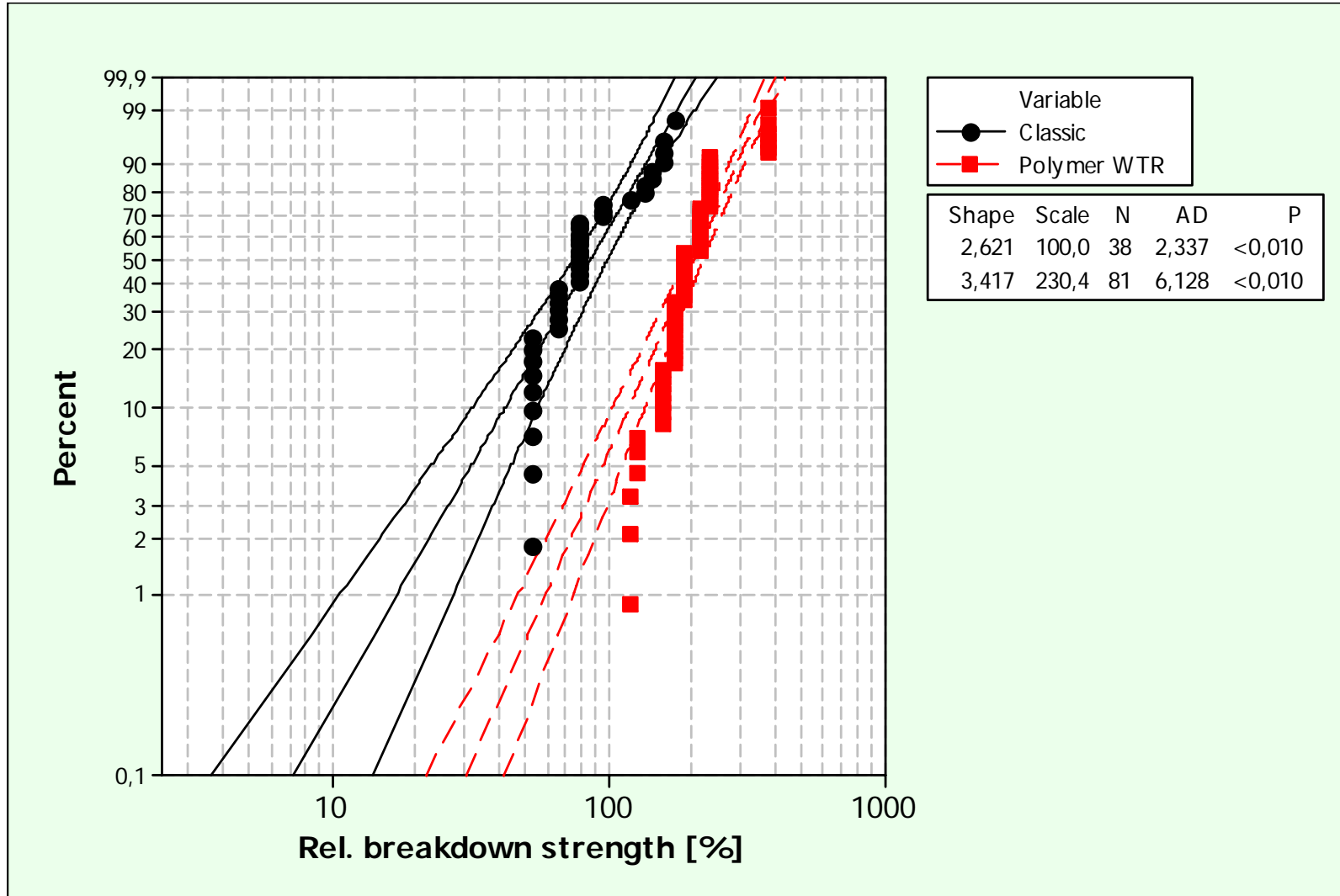
What has changed

- *CLEANER COMPOUNDS*
- *CLEANER PRODUCT HANDLING*
- *TRIPLE EXTRUSION*
- *EXTRUDED OUTER SCREENS*
- *USE OF COMPOUNDS WITH IMPROVED RESISTANCE AGAINST WATER TREES*
- *CHANGE FROM PVC TO HDPE JACKETING*

Difference of test conditions



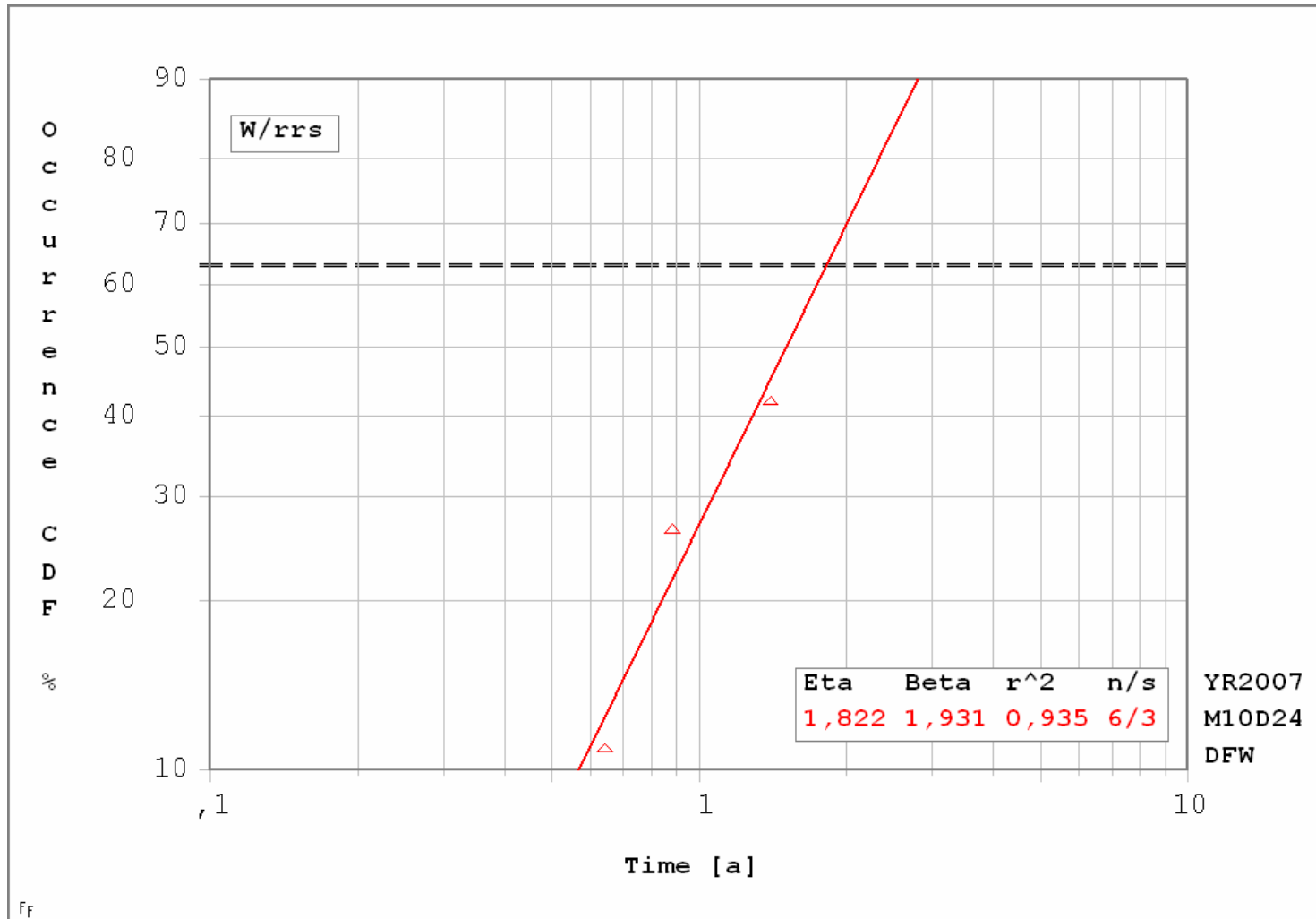
Influence of the polymer



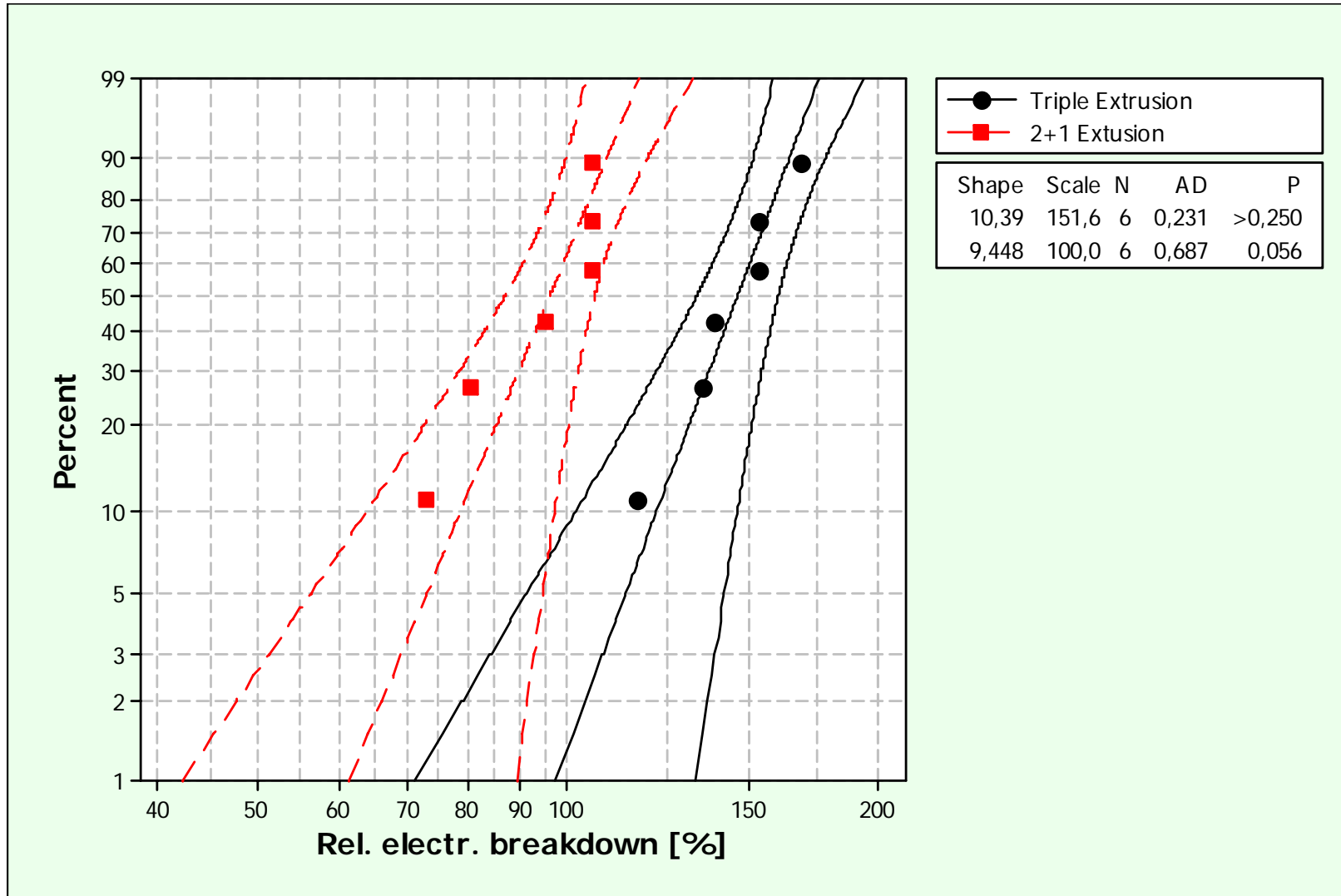
Contaminations per kg

Contamination	100-200 μm	200-500 μm	> 500 μm
Low voltage quality (as tested)	12	2	0
Medium voltage quality (as specified)	3	0	0

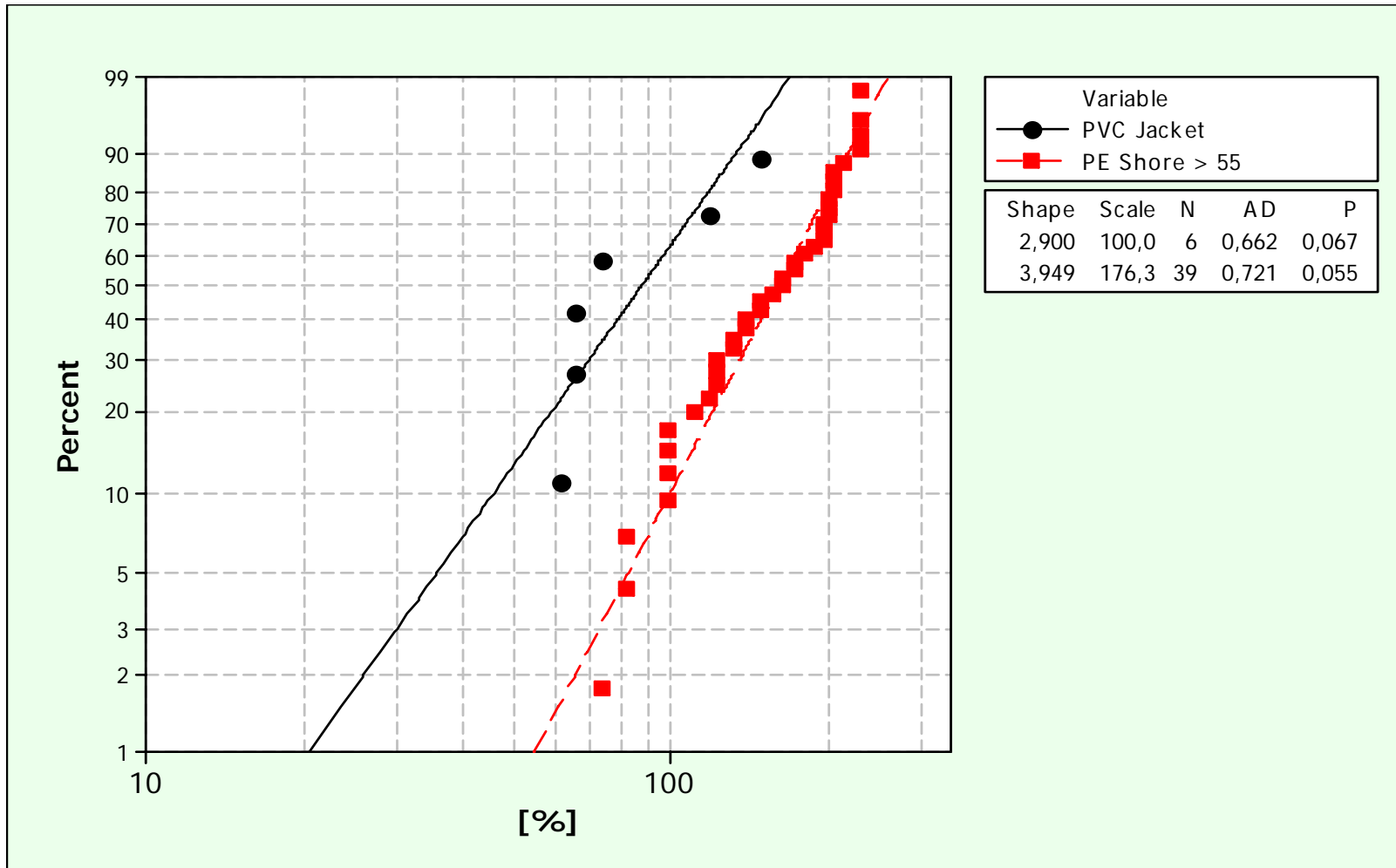
Performance of a low voltage grade in the Cenelec test



Influence of extrusion technique



Influence of jacket



Application of fifth-generation jacketing technology for improved performance DAMMERT R.C et al, JiCable 2003, p. 824 ff.

Conclusion

- **Today's modern medium voltage XLPE distribution cables in Central Europe have a close to zero rate.**
- **Each step in itself would have already prolonged the lifetime of a cable and increase the reliability of the medium voltage distribution network.**
- **Together as industry partners; equipment manufacturers, compound producers and cable makers have all made step changes in their respective process resulting, as evidenced from cable failure statistics, to a more reliable medium voltage distribution network.**
- **Today the average outage time in Germany is as low as around 19 min per customer**