

Comments on the Paper « Vacuum Interrupters - Sealed for Life »

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Three Comments:

- A little history
- The true meaning of MTTF
- Failure and “Sealed for Life”

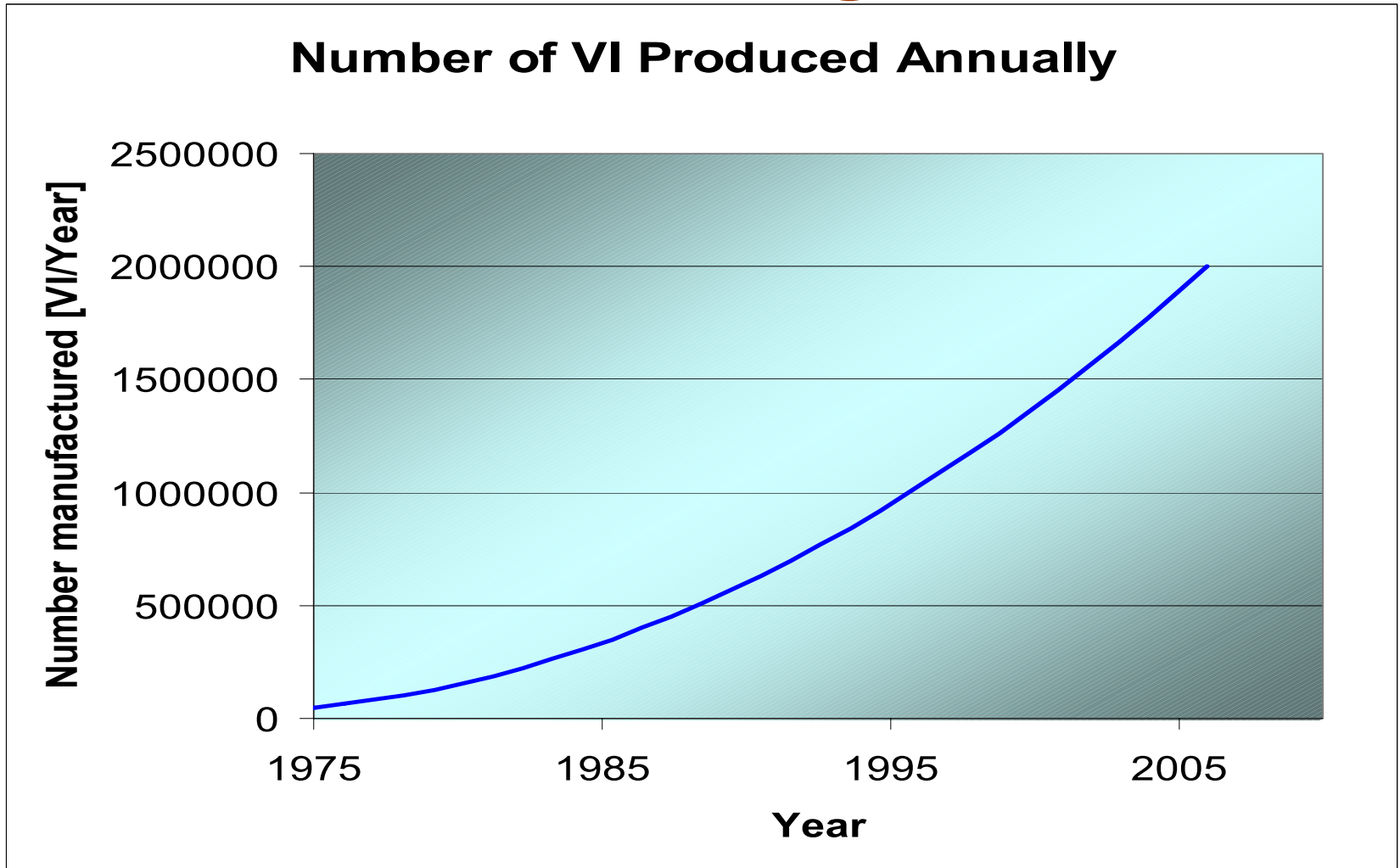
A Little History

- Most manufacturers of Vacuum Interrupters defined the Shelf (Vacuum) life as 20 years in the 1970's – not 30 years as mentioned, - in fact many still state 20 years. The quality system in manufacture was built around this number.
- Most of the paper's technical points concern interrupters designed and manufactured in recent years. They do not apply to 30 year old interrupters (for example the One Shot Seal Off process mentioned was invented in the 1980's).

A Little History

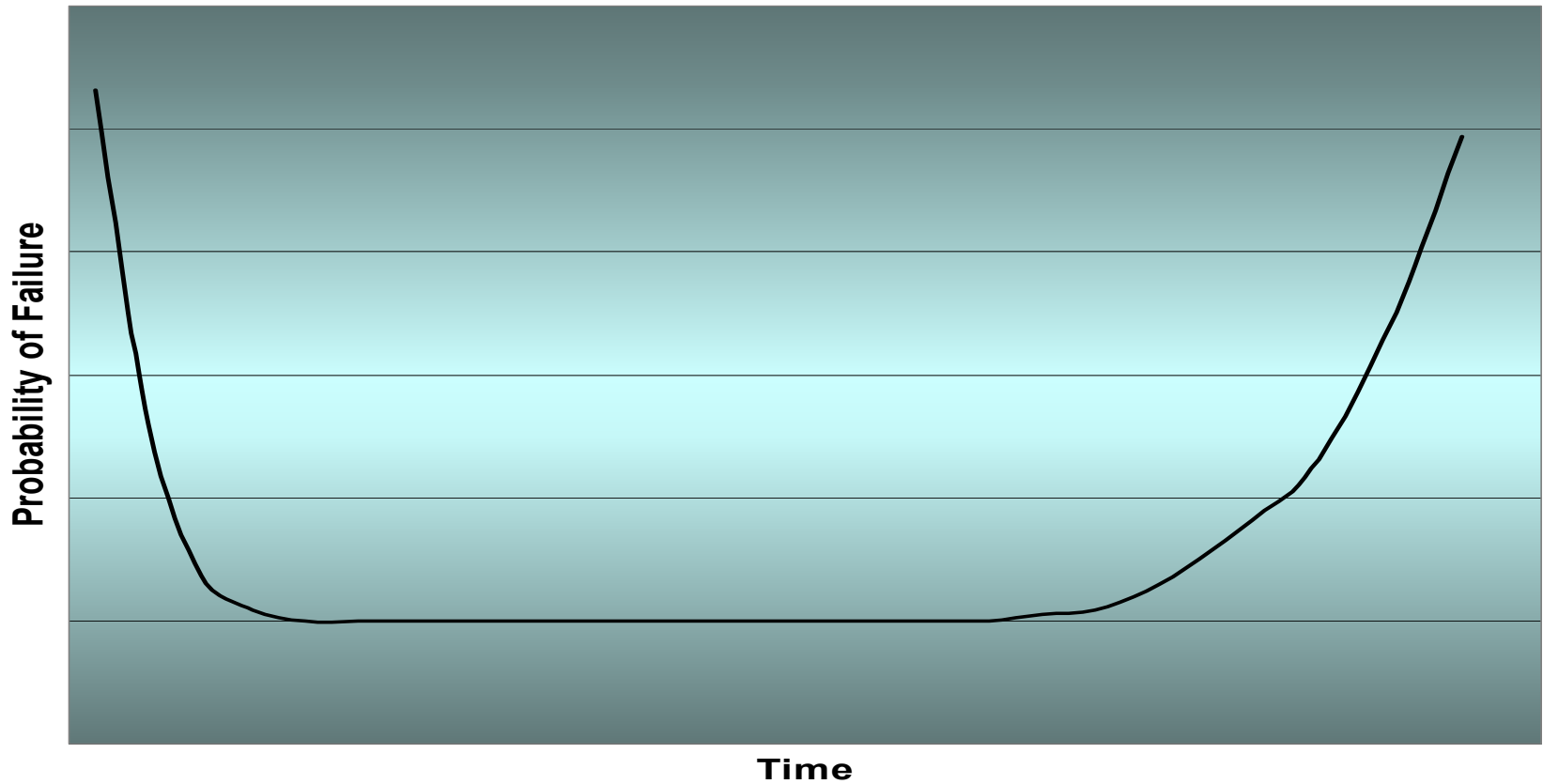
- It is not true to say that there are “Millions of Vacuum Interrupters in service for more than 35 years”. At the start of large scale commercial manufacture in the 1970’s the interrupters put into service were in the tens of thousands, not millions.
- Vacuum interrupter production has grown immensely in recent years, and my estimate is that of the 10 million interrupters mentioned, probably 7 million were manufactured in the past ten years (total from all manufacturers exceeds 20 million).

The True Meaning of MTTF

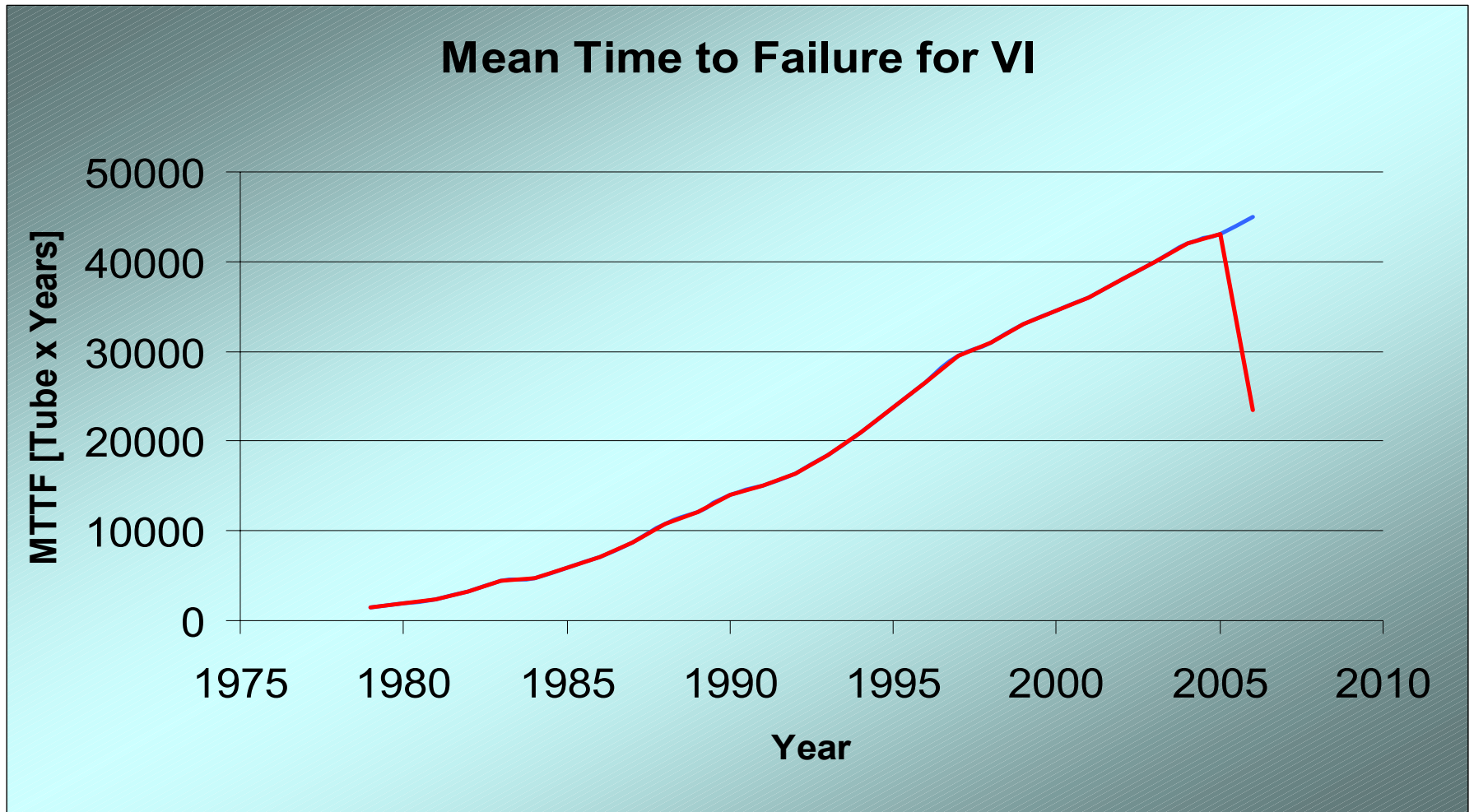


The True Meaning of MTTF

Bathtub Curve of Failure



The True Meaning of MTTF



Failure and « Sealed for Life »

Summarising:

- Interrupters in service today which are over 20 years old were not built using modern techniques.
- Rates of manufacture of VI have increased dramatically over the period which distorts the MTTF statistics.
- Failure normally follows the bathtub curve.
- “Sealed for Life” is a meaningless statement unless the manufacturer states the design life.
- Today, without further investigation, no-one knows what the actual life of VI in service will be, but if you keep it in service long enough it is guaranteed to fail.....