

# Troubleshooting & Maintenance with PROFIBUS 故障排除及维护



**PROFIBUS and PROFINET  
Expert Days 2008**

**Mr. Ing. Dennis van Booma**  
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# About the presenter 演讲者简介



Name: Dennis van Booma  
Company: PROCENEC - The Netherlands



PI working group leader; "Training"  
PI working group sub-leader; "PA Certification"

Dennis van Booma is the general manager and contact person of PROCENEC. He has more than 16-years PROFIBUS experience and is a driving force for putting PROFIBUS and PROFINET technology in the market.

Dennis has been involved in many large PROFIBUS projects and has developed the PROFIBUS and PROFINET education system. He is famous for his inspiring workshops and consultancy sessions that he is doing for companies all over the world.

## **Expertise:**

- PROFIBUS FDL, DP, DP-V1 and PA.
- PROFINET.
- IEC 61000-5-2 - EMC.
- Data transmission theory.
- RS 485 and MBP technology.
- Explosion safety.

## **Achievements:**

- Establishment of the Competence Center.
- Establishment of the Test Laboratory.
- Establishment of the Certified Engineer system.
- Has trained more than 4000 people worldwide.
- Created the PA certification guidelines.
- Approved the; Korean, Italian, German and Norwegian Training/Competence Centers.

## Introduction

Common faults

Handheld Tool

Oscilloscopes

Analyzers

Conclusions

Training

Live demo!



# Total Costs of Ownership 业主的总成本



## Introduction

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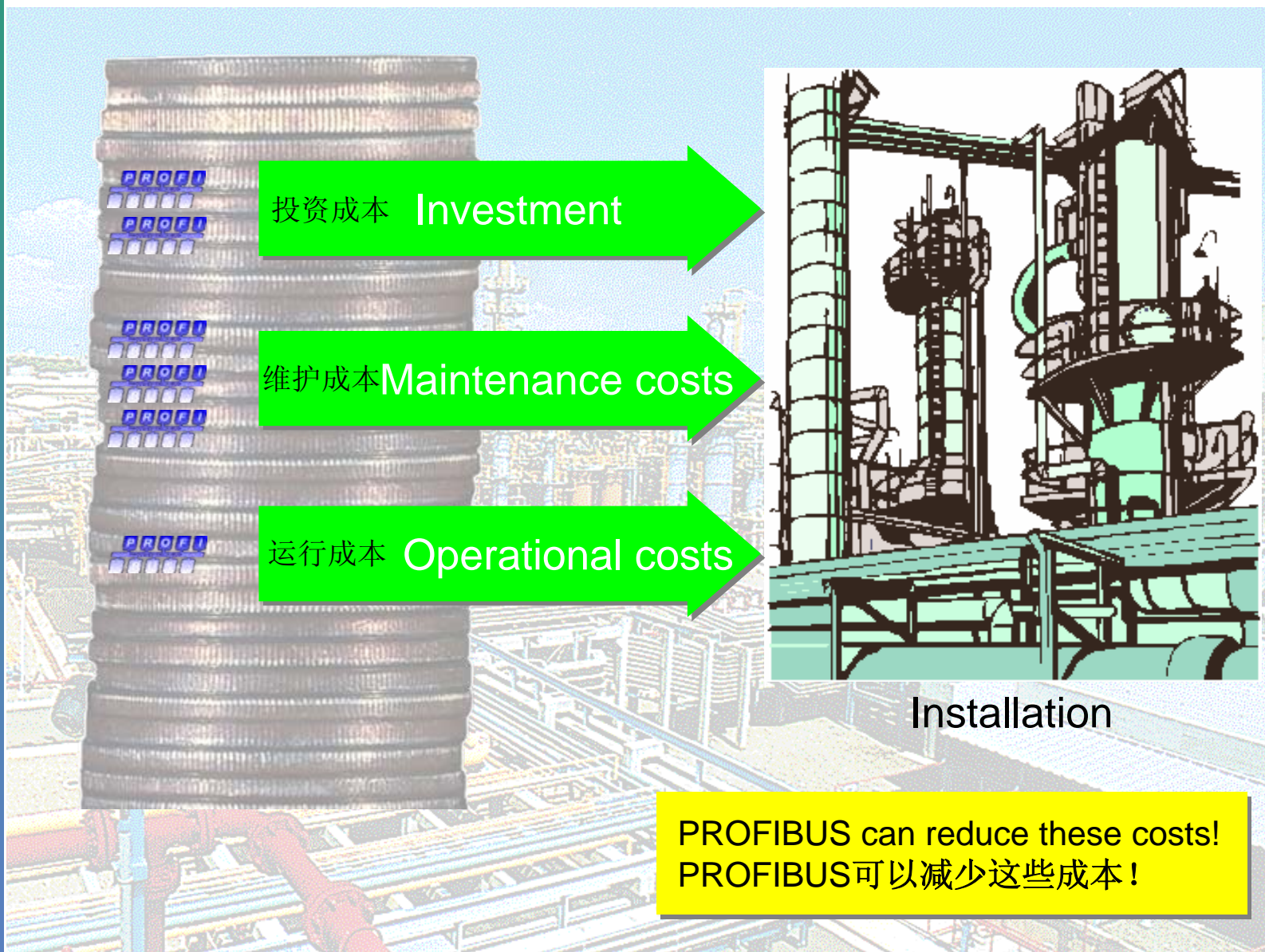
Oscilloscopes

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Conclusions

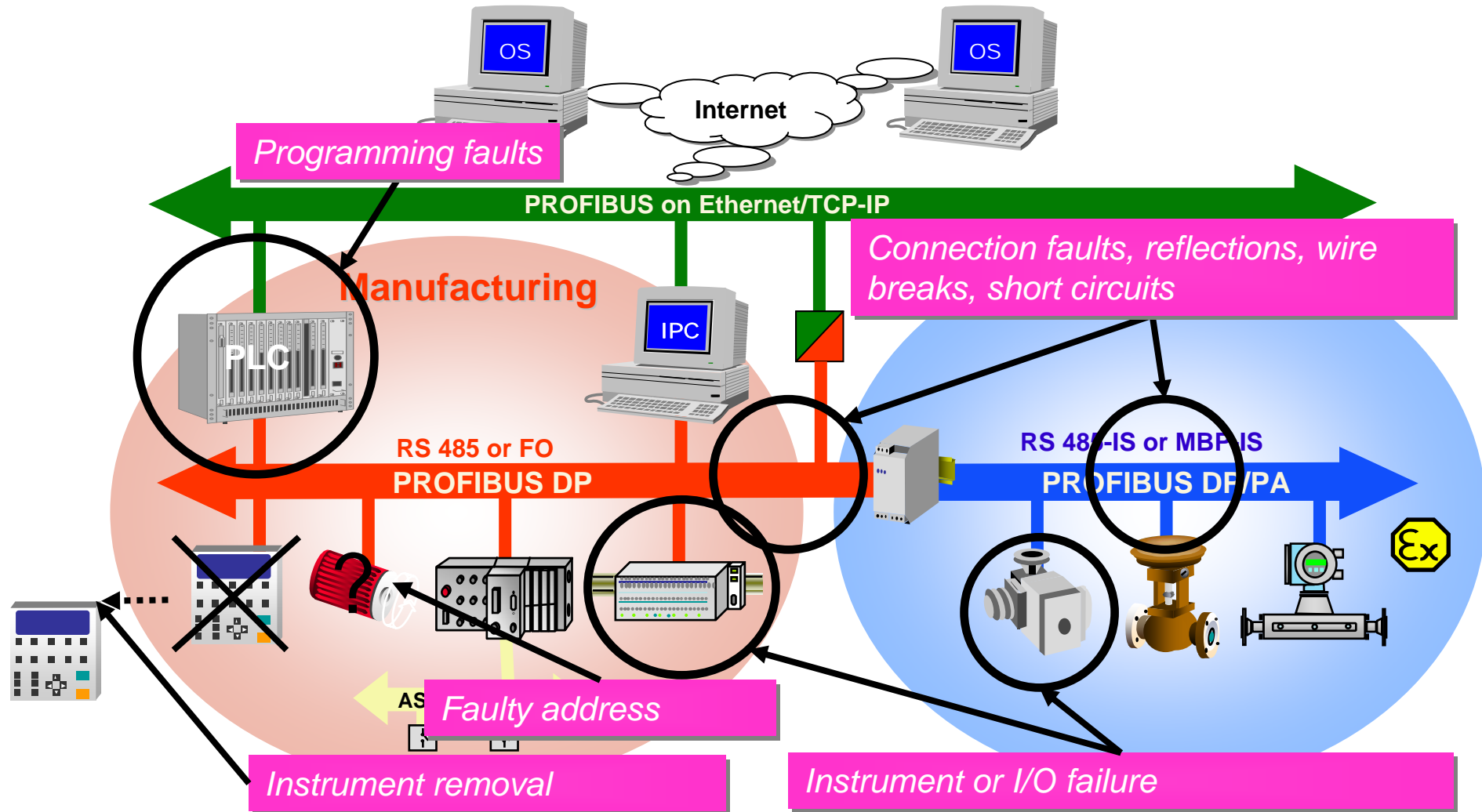
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# What can happen in a running installation?

运行系统进行中会发生什么？



# Fault top-5 投运期间5个最常出现的故障

## 1) Termination.

终端器。

## 2) Power lines.

供电电缆。

## 3) Cabling rules.

布线规则。

## 4) Configuration faults.

组态错误。

## 5) Damaged or not certified interfaces.

损坏或未经认证的接口。

Statistics from 300 field trips worldwide.

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# Examples

例子

# Spur lines too long 分支线太长

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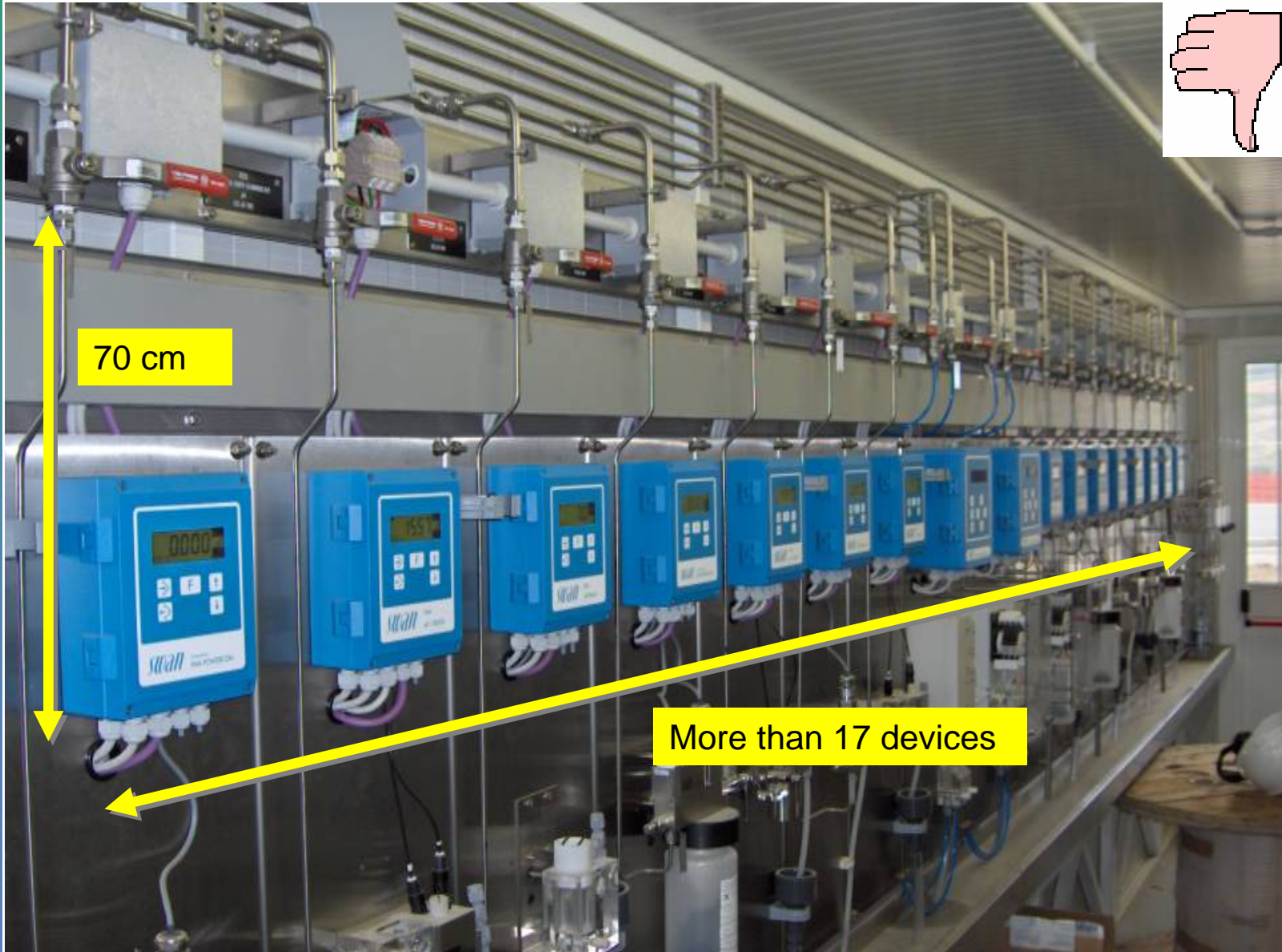
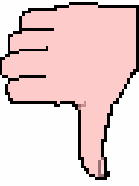
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70 cm

More than 17 devices

# Shielding NOT connected 屏蔽未连接

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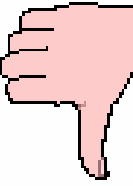
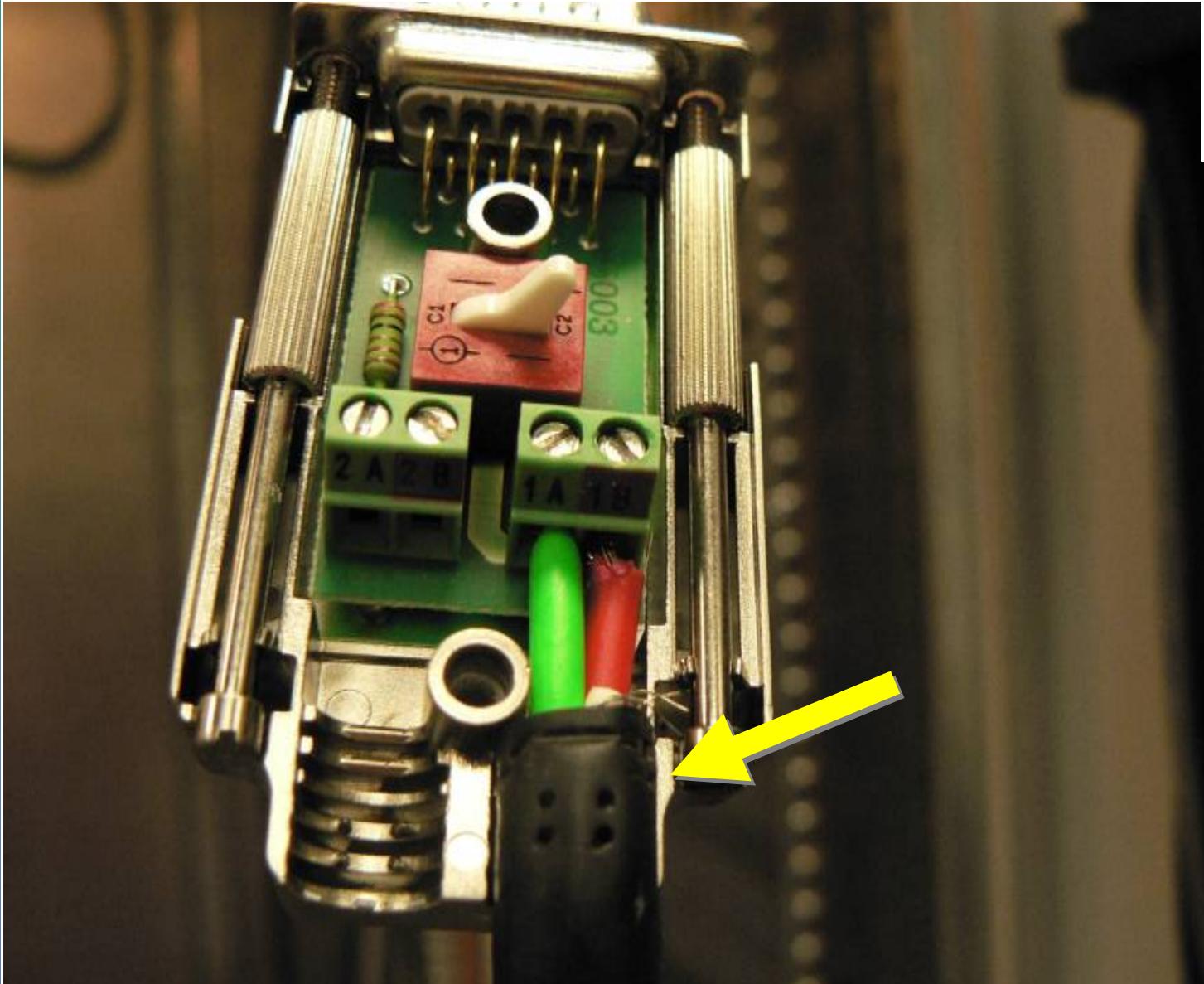
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# Moisture in junction boxes 链接盒受潮

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Installers often forget to secure spare channels. The moisture and/or dirt will cause a low impedance in the segment.

# 1 Meter rule 1米规定

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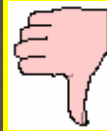
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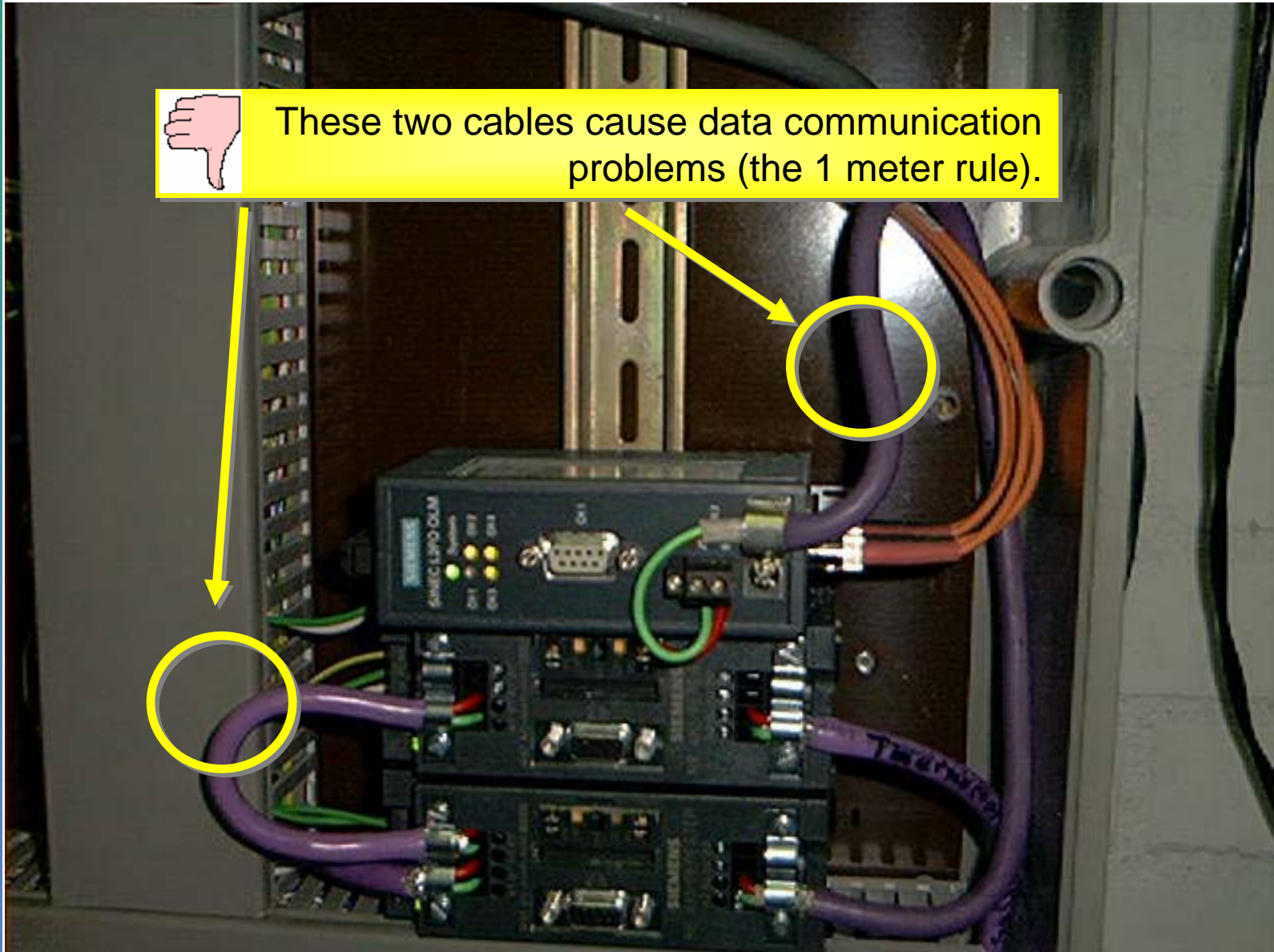
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These two cables cause data communication problems (the 1 meter rule).



# Handheld tools 便携式工具

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- **Siemens BT200**
- **ComSoft Nettek II**



## Functions:

- Wire breaks/short circuits
- Voltage or shielding faults
- Localizing faults
- Measuring cable lengths
- Termination detection
- List of slaves
- Logging



**Non active segments (masters have been removed)!**

# Oscilloscopes 示波器

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1st: Large + Difficult



2nd: Expensive



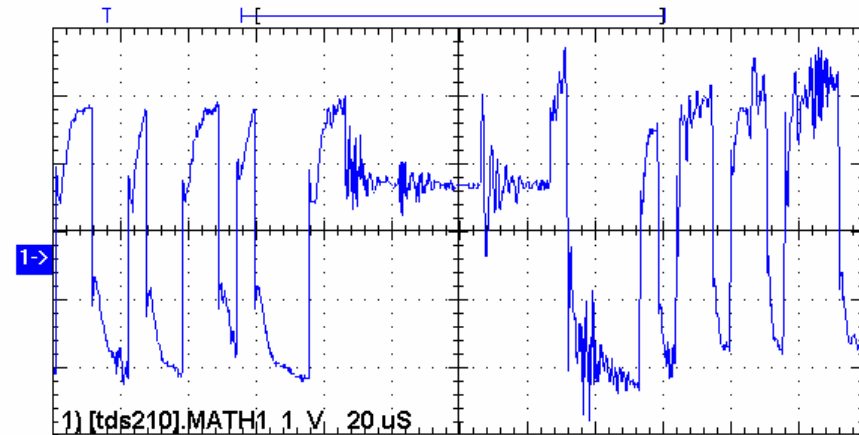
3rd: Difficult



4th: Small, Fast and Easy

## Functions

- Amplitude
- Reflections
- Noise
- EMC

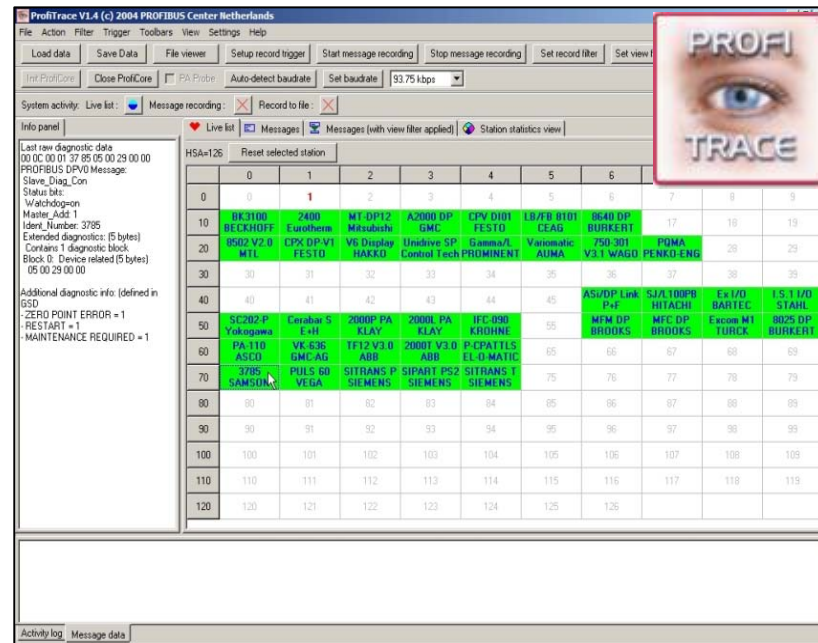


The oscilloscope is the only tool that can display the bus signals!

# Busmonitors / Analyzers 总线监视器/分析仪



- ProfiTrace 2 - PROCENTEC
- Bus check - Softing
- PBScope - T+H
- IT-Monitor - ITM / ComSoft / TMG-itec
- Amprolyzer



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## Functions

- Live List
- Messages
- Device diagnosis
- Cycle times
- Logging

# Required tools to exactly pinpoint a fault 诊断工具

Faults on DP	Passive cable	Running installation
General communication faults	<i>Not possible</i>	<b>Analyzer</b>
Double address	<i>Not possible</i>	<b>Analyzer</b>
Wrong address	BT200	<b>Analyzer</b>
No termination	BT200, Multi meter	<b>Oscilloscope</b>
Too many termination	BT200, Multi meter	<b>Oscilloscope</b>
Missing device (power off, connector removed, etc)	BT200	<b>Analyzer</b>
Device diagnostics	<i>Not possible</i>	<b>Analyzer</b>
Shortcircuit, break, crossed wires, etc	BT200, Multi meter	<b>Oscilloscope</b>
EMC problems	<b>Oscilloscope</b>	<b>Oscilloscope</b>
1 Meter rule	<i>Not possible</i>	<b>Oscilloscope</b>
Configuration faults	<i>Not possible</i>	<b>Analyzer</b>

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***Facts and Fiction***

***The most important tools for validating a network are an oscilloscope and a busmonitor/analyzer.***

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# conclusions

结论





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# *Facts and Fiction*

*A multi-meter is NOT  
useable for dynamic signal  
measurement!*

# Working with a Laptop/PC is a must! 使用PC机工作成为必备条件!



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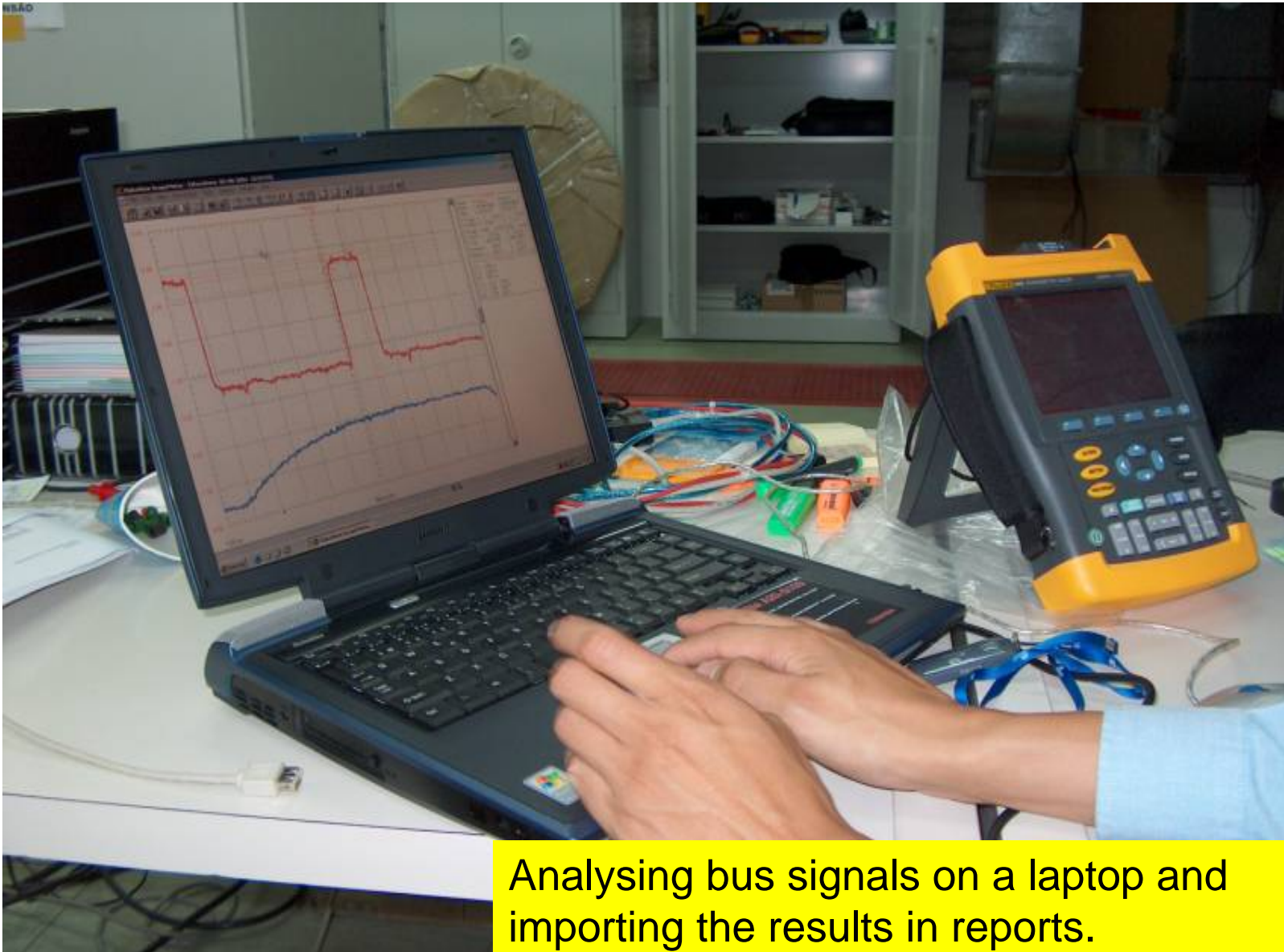
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Analysing bus signals on a laptop and importing the results in reports.



# Training is absolutely necessary 培训是必不可少的

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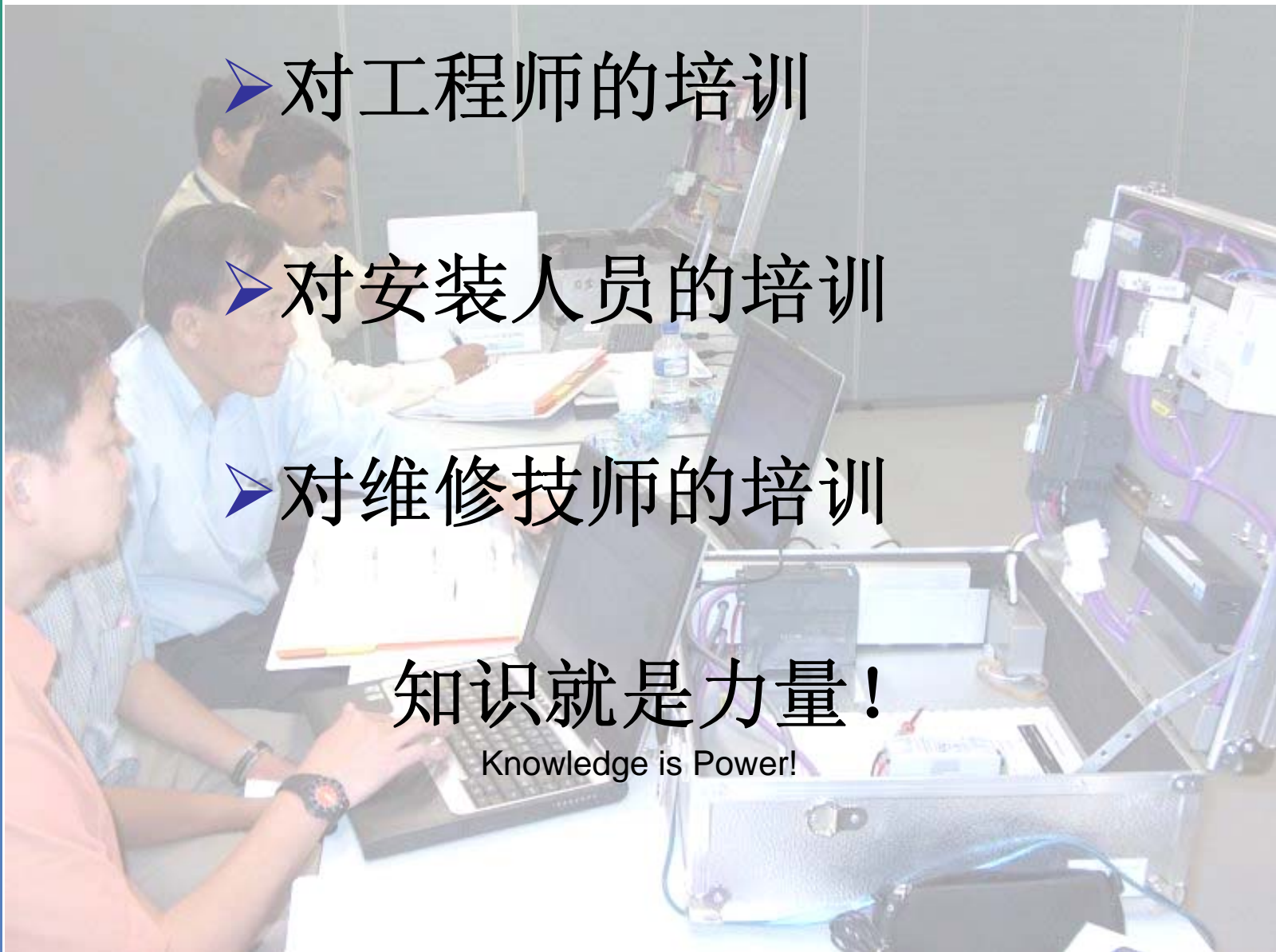
▶ 对工程师的培训

▶ 对安装人员的培训

▶ 对维修技师的培训

知识就是力量!

Knowledge is Power!



# Troubleshooting training in June 2008

## 2008年6月将举办故障排除培训



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**CAMETA and PROCENTEC are proud to organize a new PROFIBUS Troubleshooting and Maintenance training class.**

This first-class training is an intensive theoretical and practical 3-day course to obtain valuable knowledge about troubleshooting a PROFIBUS DP/PA installation.

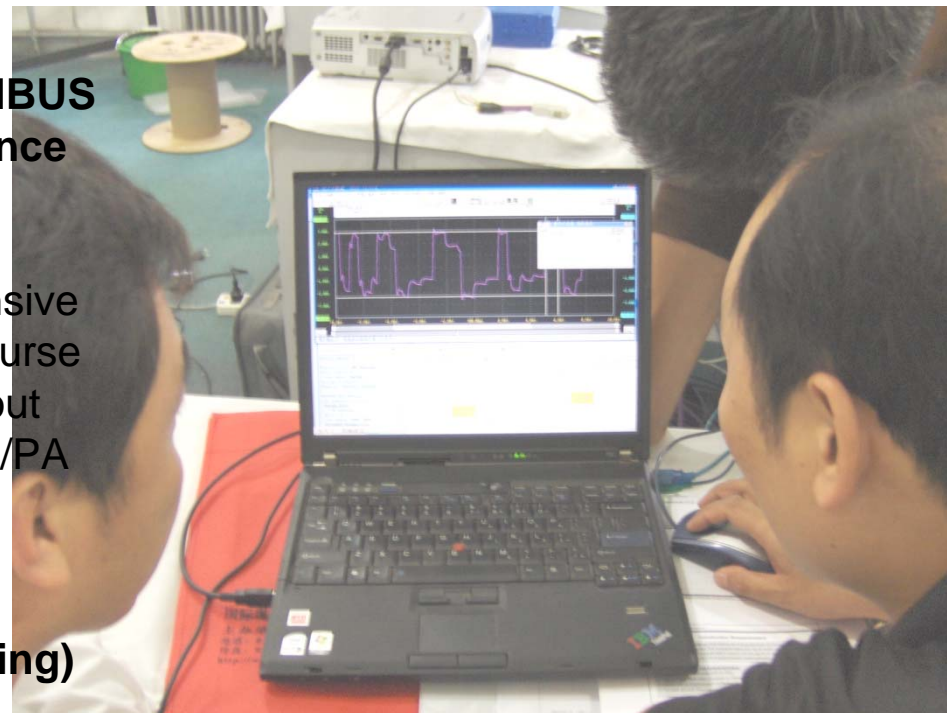
**Dates: 16 to 18 June 2008**

**Place: BEIJING (CAMETA building)**

**Costs: CNY 8000.-**

For reservations or questions, please contact CAMETA:  
[training@cameta.org.cn](mailto:training@cameta.org.cn).

**Don't miss this unique and valuable training course.....**



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# Live demo

演 示



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# The End

Ing. Mr. Dennis van Booma,  
PROCENTEC Netherlands,  
[dbooma@procentec.com](mailto:dbooma@procentec.com)

- ✓ 一个完全独立的公司。
- ✓ 主要从事**PROFIBUS**和**PROFINET**技术的开发和服务。
- ✓ 贸易活动遍布欧洲，亚洲和北美洲。
- ✓ 主要活动包括：
  - 现场操作(如现场故障排除及工程技术支持)
  - 认证(对产品和安装进行认证)
  - 接口产品的开发
  - 进行认证培训



# ProfiTrace 2 – Combi-Analyzer for PROFIBUS

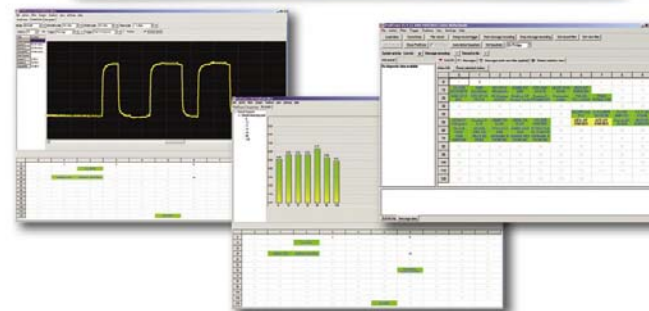
A giant leap forward for PROFIBUS with the incredible ProfiTrace 2. It is the most powerful analyzer for PROFIBUS networks. It combines ALL primary tools in one:

- Analyzer (protocol quality)
- Oscilloscope (signal quality)
- Bar graphs (network quality)
- Master (DP and DP-V1)
- Reporting

Technicians can check and troubleshoot the complete PROFIBUS network with 1 software package and 1 piece of hardware. This results in an enormous reduction in equipment, weight, costs and required knowledge.

ProfiTrace is an essential tool for maintenance, commissioning and troubleshooting. Predictive maintenance and asset management are now really possible! This outstanding tool that fits in your pocket will boost the limits and capabilities of service-, maintenance- and engineering technicians.

[www.procentec.com/profitrace](http://www.procentec.com/profitrace)





# ProfiHub B5 – Spur repeater for PROFIBUS DP

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- **5 Isolated channels**
- **9,6 Kbps to 12 Mbps**
- **31 devices per channel**
- **Max. 1200 m spur line length**
- **IP 20 classification**

