



CASE STUDY

**PROFIBUS network failure
resolution and maintenance
for one of the biggest
brewery manufacturer in the
world**

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UTTHUNGA TECHNOLOGIES

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utthunga
Engineering Transformation

PROFIBUS network failure resolution and maintenance for one of the biggest brewery manufacturer in the world

Client: AB InBev, Mysore, India



Anheuser-Busch InBev SA/NV, commonly known as AB InBev, is a multinational drink and brewing company based out of Leuven, Belgium

Source: <https://www.ab-inbev.com/>

Customer Testimonial

With Utthunga's help, we were able to identify the malfunctions that were causing a lot of communication issues and huge downtime in the production lines. These malfunctions were not easily identifiable with normal tools. With the special tools and troubleshooting techniques from Utthunga, majority of our issues got solved and we were back on track with very good line efficiency of up to 90-95%. The dedication level and support of Utthunga team is immense and is truly reliable. We are fully satisfied with the services provided by Utthunga Technologies.

Mr. Sharath Kumar
AM- PKG, AB InBev

CUSTOMER'S CHALLENGE

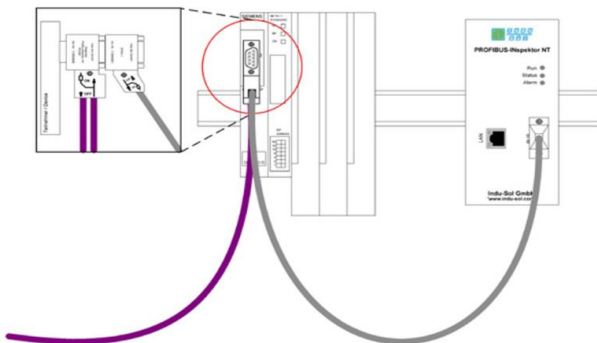
AB InBev's Mysore manufacturing site at Bannur experienced regular PROFIBUS communication failure the packaging division resulting in tremendous production loss. The maintenance team was facing intermittent bus communication failures. The maintenance team was spending significant time in troubleshooting the issues, which had substantially increased the maintenance cost.



AB InBev Plant

SCOPE OF WORK

Utthunga utilized Indu-Sol's state-of-art PROFIBUS network diagnostic solution in the AB InBev plant, which identified the PROFIBUS network issues. Utthunga is an authorized partner for the distribution and support of the complete Indu-Sol network diagnostics tools in India. The PROFIBUS-INspektor® NT tool, a permanent monitoring tool, was installed in the main panel where it continuously monitored the logical telegram exchange when the plant was running. The PROFIBUS-INspektor® NT pinpointed the error in the Network.



The PB-INspektor® NT diagnostic tool is permanently set up to evaluate the logical communication.

With a help of the PROFIBUS-INspektor® NT tool, the diagnostic messages in a time window of minimum one hour, Utthunga PI certified network experts analyzed the existing condition of the plant network along with real time data transmission.

UTTHUNGA'S SOLUTION

PROFIBUS-INspektor® NT was installed in each controller (PLC), and was monitored continuously for twelve hours. The issue of repeat telegram was identified which was resulting in the PROFIBUS slaves not responding after a pre-defined time.

Further exercise to pinpoint the error was done using the signal quality tester PB-Q ONE in different segments of the network. PB-Q ONE helps understand the quality value and voltage level. The Utthunga experts also verified the PROFIBUS line wire break, impedance, and shielding using cable tester PROFtest II XL.

It was concluded that the network failures in plant occurred due to:

- Improper segmentation in the PROFIBUS network
 - Low impedance in the PROFIBUS cables in few areas
 - Shielding not as per PI (PROFIBUS & PROFINET) standards
- One meter rule (length of less than one meter between two nodes leads to reflections on the line and introduces errors) was not being followed as per PI standards

Overview					
Baud rate	187,5 kbit/s				
Number of masters	1		Number of slaves	108	

Network statistics							
	Measured values		Thresholds				
	Last minute	History	!	✘			
Error frames	!	31	!	9464	1	-	
Max. repetitions within one cycle	✓	0	!	1	1	-	
Repeat telegrams	✓	0	!	5	1	-	
Breakdowns	✓	0	✓	0	-	1	
Restarts	✓	0	✓	0	-	1	
Diagnosis (internal)	✓	0	✓	0	1	-	
Diagnosis (external)	✓	0	✓	0	1	-	
Cycle time min / avg / max (in ms)	246.36 / - / 251.99		246.32 / 247.64 / 254.16			-	-

Figure-1: The errors displayed in the PROFIBUS INspektor during the 12-hour run

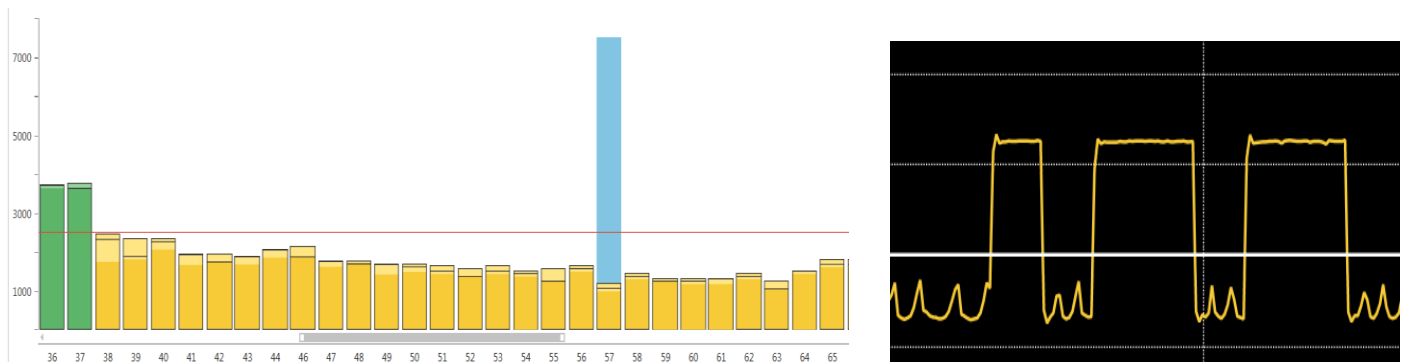


Figure-2: The voltage level of communication in the packaging division tested using PBQ-ONE

Utthunga recommended AB InBev to put Indu-Sol's MULTirep X5 Repeater (5 channel) in between the network for proper PROFIBUS segmentation. Utthunga demonstrated a test run using the repeater which prompted a change in the architecture. After using the repeaters to split the network to four segments, the communication voltage (signal quality) of PROFIBUS network was enhanced. The diagram below shows the X5 repeater (5 channel) installed in the line.



Multirep-X5 – 5 channel repeater

Figure-3: Five (5) channel repeater installed in the packaging line

The following tests below show the change in the readings:

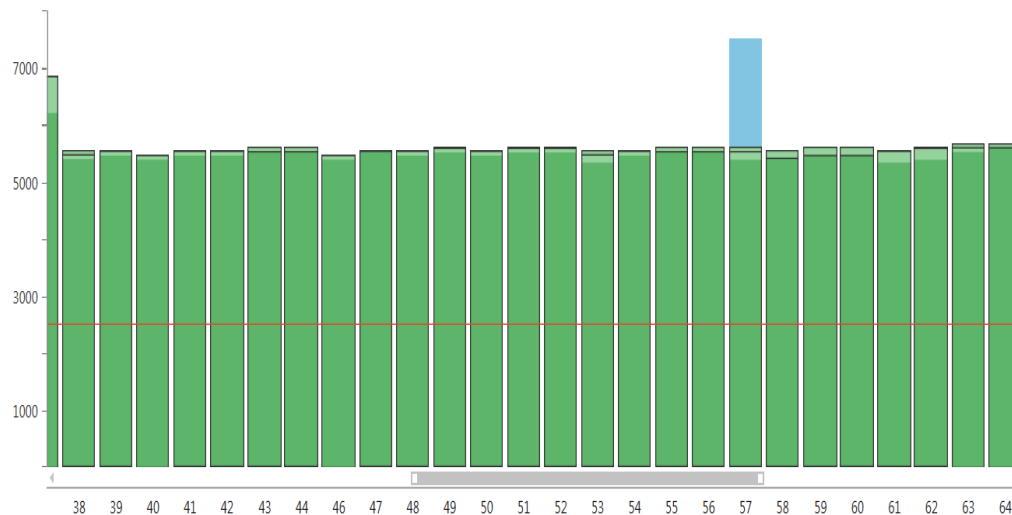


Figure-4: Segmentation done as per PI standard using MULTirep X5 Repeater

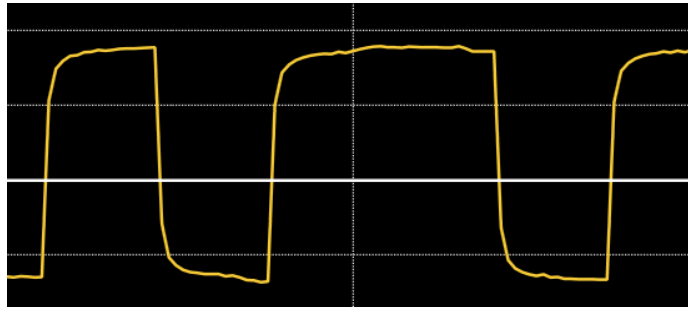


Figure-5: The improved signal quality level in wet end

Overview					
Baud rate	187,5 kbit/s				
Number of masters	1	Number of slaves	108		

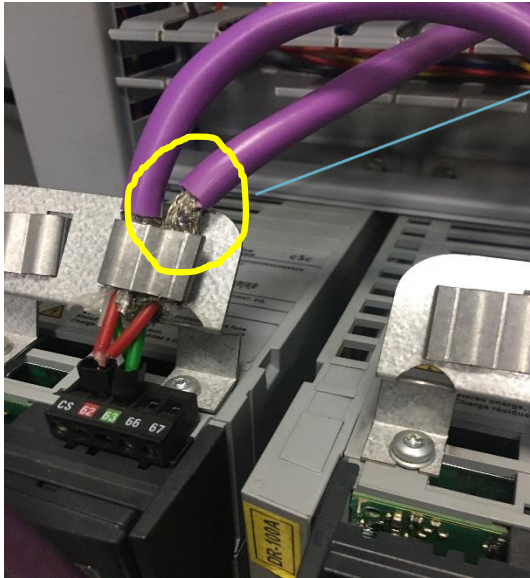
Network statistics							
	Measured values				Thresholds		
		Last minute	History		!	✘	
Error frames	✓	0	✓	0	1	-	
Max. repetitions within one cycle	✓	0	✓	0	1	-	
Repeat telegrams	✓	0	✓	0	1	-	
Breakdowns	✓	0	✓	0	-	1	
Restarts	✓	0	✓	0	-	1	
Diagnosis (internal)	✓	0	✓	0	1	-	
Diagnosis (external)	✓	0	✓	0	1	-	
Cycle time min / avg / max (in ms)		247.92 / - / 254.60		247.90 / 249.19 / 254.60		-	-

Figure-6: The error free network after running PROFIBUS INSpektor in the network for fourteen (14) hours.



Shielding done in the VFD was not as per standards.

This lead to leakage of current, which in turn affected the bit transition in PROFIBUS communication hence leading to intermittent failures.



Shielding in the VFD made as per standards.

Proper grounding avoids harmonics in the PROFIBUS communication which in-turn helps in the stability and health of the communication.

Figures - 7 & 8: Improper shielding noted and rectified by the Utthunga PROFIBUS network experts

CUSTOMER'S BENEFITS

After the complete PROFIBUS Network audit, the customer was able to:

- Prevent network failures
- Improve operational efficiency
- Boost plant availability and productivity

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