

# Wireless Instrument Transmitters on Wellhead Towers

Ankeet Anil Kaji

P.E., FSE TÜV, PMP®, CEng.

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**Abstract:** Wireless communication is a major innovation in field digital technologies. They are fast emerging as a complementary technology to wired instrumentation in the oil and gas industry. The features of Wireless HART in field digital technologies are as follows,

It is a global IEC-approved standard (IEC62591) and owned and governed by the HART Foundation

Data security by encryption

Easy power-supply cell maintenance in hazardous areas

Supports mesh topologies, providing redundancy not only at IO level but also on communication between Instrument to Control System

Provides complete access to the instrument HART diagnostics without the need of HART multiplexers

Expandability and consistency with existing systems

The network can be progressively expanded without wasting customers' assets.

**Keywords:** DCS, HART, IEC.

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## I. INTRODUCTION

Intelligent field instruments and process analyzers collect diverse field information including process values and diagnostic results. This data needs to be sent to higher systems such as Distributed Control Systems (DCS) to enable the customer to utilize them for plant operations and maintenance. There is thus a need to evolve these instruments to meet changing needs in the areas of power saving, improved operability, and long-term stability.

## II. RESULTS AND OBSERVATIONS

Study was done for Typical Un-manned Platform of 10 wells (~ 50 nos). The analysis establishes the below Savings:

- 7.9 Ton Weight savings with Wireless comparing with Conventional (4-20mA) Design
  - The weight savings estimated is only for the Top Side.
  - Corresponding impact on the Weight of the Jacket will be additional.
- \$601.8K Cost savings with Wireless comparing with Conventional (4-20mA) Design.
  - This includes cost savings coming from of Jacket Weight reduction corresponding to 7.9 Ton savings on the Top-side (estimated at \$20,000 per ton).
- 8,195 Man Hours' Time savings with Wireless comparing with Conventional (4-20mA) Design.
  - This is critical as C&I portion typically comes at final stage of the project and can have an impact on the start-up date.
- 155W Power savings in Field with Wireless comparing with Conventional (4-20mA) Design

Table 1:

Capital Efficiency	Operational Efficiency
<ul style="list-style-type: none"> <li>Reduced Project automation CAPEX – 18%</li> <li>Reduced Platform Weight.</li> <li>Easier Project Management</li> <li>Flexibility to adapt Design &amp; Engineering Changes throughout the Project cycle.</li> <li>Reduced footprint of UPS / Battery-backup.</li> <li>Reduced Project Documentation.</li> <li>Faster FAT &amp; Commissioning.</li> </ul>	<ul style="list-style-type: none"> <li>Reduced Maintenance &amp; periodic inspection of Electrical Cables and related hardware.</li> <li>Provides Expansion Flexibility</li> <li>Monitor, Analyze &amp; Predict health of Important Assets like pumps, etc.</li> <li>Reduced Power Consumption</li> <li>Improved Reliability of Process Communication with redundant paths of communication.</li> <li>Easy Rig Movement as there is no cabling.</li> <li>Taking instrument out for maintenance does not need Isolation of the Loop.</li> </ul>

Table 2:

Scenarios	Cost (USD)	Time (Hrs)	Weight (Kg)
Conventional Solution	3,349,739	3,383	45,678
Wireless Solution	2,907,178	2,610	37,712
Savings	442,561	773	7,966
Jacket Material & Installation Savings	159,325	To be Estimated/Additional	-
Installation time Savings for JB, Cables, Cable Trays, Steel Support & Structure	-	7,422	-
Offshore Mobilization, Project Management & Rental Cost	To be Estimated/Additional	To be Estimated/Additional	-
Total Savings	601,886	8,195	7,966
% Savings	18%		17%

### III. CONCLUSION

Wireless is now a pervasive aspect of everyday life; from the Bluetooth module in a mobile handset to broadband wireless networks covering scores of square kilometers. No longer is wireless networking an experimental technology, it has become ubiquitous, and wireless closed-loop control is now being seriously considered for oil & gas industry. Wireless networking enables the vision of a security enterprise - ease of expansion with minimal implementation and maintenance costs. The bottom line is that wireless networking is cheaper.

### REFERENCES

#### Books:

- [1] "WirelessHART: The Next Generation of Wireless for Process Automation" by John L. Dutton
- [2] "Process Automation Handbook: A Guide to Theory and Practice" by Gregory K. McMillan and Douglas M. Considine

#### Standards:

- [3] IEC 62591 (Wireless HART)