

**ICT**

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**INTRODUCTION  
TO  
TRAINING IN COMPLETIONS  
&  
COMMISSIONING ENGINEERING**

**IndustriConnect Technologies Pvt Ltd.**

[www.industri-connect.com](http://www.industri-connect.com)



## CONTENTS

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- *WHO WE ARE*
- *WHAT IS COMPLETIONS PHILOSOPHY*
- *WHAT IS COMMISSIONING ENGINEERING*
- *HOW THESE COURSES DIFFERENT FROM OTHERS*
- *BENEFITS TO STUDENTS & INDUSTRIES*
- *WHERE IS AUTOMATION APPLIED*
- *TYPICAL INDUSTRIES FOR EMPLOYMENT*
- *COURSES OFFERED (CRASH, SHORT )*
- *TYPICAL ENGINEERING DELIVERABLES & EXPLANATIONS*



## WHO WE ARE –CORE TEAM MEMBERS

WHO WE ARE	A group of experienced professionals from Industry, belonging to different engineering disciplines & having served various industry verticals in India and abroad
OUR VISION	To disseminate the knowledge & experience gained by us to students by conducting training programmes & make them industry ready
FOUNDER & DIRECTOR	<p><u>Name:</u> Vinay Avanchi <u>Qualifications:</u> B.E.(Electrical),M.E.(Control systems) <u>Experience:</u> Around 38 yrs in Industrial Automation <u>Activities Handled:</u> -System design &amp; Detailed Engineering -Project Completions &amp; Commissioning engineering <u>Employers worked with / industries:</u> -S.Korea:Samsung Heavy Industries (<a href="http://www.samsungshi.com/eng">www.samsungshi.com/eng</a>) Offshore Oil &amp; gas (FLNG/FPSO hull side) -India: SAIL (Steel &amp; Fertilizer Plants) (<a href="http://www.sail.co.in">http://www.sail.co.in</a>) MECON Ltd.(Steel, Chemical &amp; allied industries)(<a href="http://www.meconlimited.co.in">www.meconlimited.co.in</a>) <u>Memberships :</u> Senior member &amp; Programme Manager-Events, International Society of Automation, Bangalore section, <a href="http://www.isabangalore.org.in">www.isabangalore.org.in</a> Fellow, IETE-Institution of Electronics &amp; Telecommunication Engineers, Bangalore section <u>Contact:</u> <a href="mailto:vinay_avanchi@yahoo.com">vinay_avanchi@yahoo.com</a>, <a href="mailto:vinay.avanchi@industri-connect.com">vinay.avanchi@industri-connect.com</a> Mob:+91-7760005270</p>



## WHO WE ARE –CORE TEAM MEMBERS

### MANAGER (AUTOMATION)



Name: SUJIT HARODE

Ex. Manager ( ICSS/Automation) E&I Dept. Daewoo Shipbuilding and Marine Engineering

Certified Functional Safety Engineer (TUV Rheinland,Germany)

Certified DCS Programmer (FOXBORO, Invensys)

Qualifications: BE. Instrumentation & Controls (Automation)

Experience: Around 13 yrs in Industrial Automation

Activities Handled:

- Control System design & Detailed Engineering
- Project Completions & Commissioning engineering
- Safety Requirement Specification (SIL/SIS)
- DCS/PLC/Intools- Onshore/Offshore/Refinery/Petrochemical Plant

Employers worked with / industries:

- South Korea : Daewoo Shipbuilding & Marine Eng./ Samsung Heavy Ind. Ltd. /Hyundai Heavy Ind. Ltd
- Invensys(Shneider electricals)- India

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## WHAT IS COMPLETIONS PHILOSOPHY

- Completions Philosophy is a set of specifications which act as the basic tools necessary to obtain a smooth transfer of any industrial project from the construction team to operations team, as quickly as possible, in full confidence and with all the required safety
- These specifications provide the basic information, procedures and support documents required to carry out the on site mechanical completions, precommissioning & commissioning activities in a planned, safe and efficient manner
- Completions philosophy requirements are implemented through a project completion system, which is a computer software application, that manages the preparation, execution and monitoring of precommissioning and commissioning phases of the project
- Though this philosophy is primarily followed in oil & gas industry through their design, construction, precommissioning and commissioning stages, however this *philosophy can also be applied to any small, medium and large **onshore industries** by making necessary modifications to suit the specific industry requirements*



## WHY THIS COURSE IS ESSENTIAL

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- The technical complexity of new industrial projects is on the increase as these projects involve sophisticated data, control and safety systems. Higher efficiency, reliability, safety & flawless delivery are also expected from these projects.
- Therefore understanding of the concepts of completions philosophy as practiced in the industry is essential.
- Our Training courses aim to provide these concepts to
  - *Students belonging to Instrumentation & Control, Electrical, Electronics & Communication engineering disciplines interested in pursuing their career in Industrial Automation to become industry ready and employable*
  - *Industry Automation professionals to enhance their skills to boost their career growth*



## HOW THESE ARE DIFFERENT FROM OTHERS..

- Based on the decades of practical knowledge & experience gained by professionals who have worked in various industry segments
- Cover concepts of Planning & execution of field activities followed in real life Industrial Automation projects
  - ✓ *These essentially cover the conceptualization, preparation of Functional documents and management of various activities required during installation, testing and commissioning phases of any project.*
  - ✓ *These set of documents are **Essential Prerequisites** for starting the field execution activities of any given project for all the stake holders of any automation projects namely EPC contractors, Clients, Consultants and vendors.*
- Include Practical course material & case studies from various Industry segment
- Provide direct interaction with expert professionals through classroom sessions & continued support even after course completion.



## BENEFITS TO STUDENTS & INDUSTRY

- On successful completion of this course students can easily and quickly adopt to actual industry requirements and hence their potential for seeking employment will increase
- Students belonging to Electrical, Electronics & Communication engineering disciplines will have the following specific benefits:
  - ✓ *They can continue to work in their own disciplines and when required they will find it easy to automate the respective industry segments in which they work*
  - ✓ *Those interested in Automation can further learn more about Automation and switch over to Automation discipline as their career*
- Industries employing these pre-trained students can save considerable time in imparting the in house trainings to these candidates when they are recruited in the respective industries.





# WHERE IS AUTOMATION APPLIED

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## TYPICAL INDUSTRIES FOR EMPLOYMENT

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- Automation vendors
- Engineering Consultancy
- Oil & Gas
- Petrochemicals & Fertilisers
- Chemicals & Pharma
- Mining & Metals
- Energy, Utilities
- Cement
- Paper & Pulp
- Healthcare
- Hospitality Industry
- Industrial Software
- Information Technology
- R & D Labs
- Food Processing
- Construction – Building Automation
- Consumer Goods
- Paints & Dye Stuffs
- Breweries
- Automotive



List of  
industries-few examples



## COURSE OFFERED

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The course is mainly intended to cover the ***Concepts of Completions & Commissioning Engineering practices followed in real life Industrial Automation projects***. It has been designed to meet the requirements of different cross sections of participants right from college students, fresh industry professionals to senior executives.

➤ ***Short course*** (Typically of 5-6 hours/day duration for 2 days)

*For details , please refer course brochure*



## TYPICAL COURSE MODULES

1. *Introduction to Completions philosophy*
2. *Introduction to Commissioning Engineering*
3. *Interdisciplinary coordination*
4. *Vendor Management (FAT & SAT)*
5. *Case studies*



## TYPICAL DELIVERABLES

### COMPLETIONS

- *Sample completions philosophy*
- *System/Sub system list*
- *Mechanical Completion (MC) check /test sheets*
- *Pre-Commissioning (PC) test sheets*
- *Boundary Mark-up drawings*
- *MC work packs*
- *PC Work packs*
- *Punch list management*
- *Progress reports*

### COMMISSIONING ENGINEERING

- *Management of Automation vendor's FAT (Factory Acceptance Test)*
- *Review of Automation vendor's SAT (Site Acceptance Test) for Automation system*
- *Preparation of CTP, Commissioning Test Procedure as per project standards*





## BRIEF EXPLANATION OF MAJOR DELIVERABLES

<b>Completions database</b>	<p><i>A Software tool for executing installation, testing and commissioning activities. It is populated on an individual Tag basis by inputting all the information relevant for the particular tag. Once populated, various check and test sheets can be printed out for carrying out installation, testing and commissioning. It also has the provision to generate progress reports, punch list management, issue the required certificates etc.</i></p>
<b>Commissioning Test Procedures(CTP) for ICSS</b>	<p><i>These are prepared based on the SAT procedures furnished by the ICSS vendors. It involves the procedure for carrying out the following activities and is done prior to the loop test activities</i></p> <ul style="list-style-type: none"><li>➤ <i>Installation checks</i></li><li>➤ <i>Powering up</i></li><li>➤ <i>Hardware testing</i></li><li>➤ <i>Software testing</i></li></ul>



## BRIEF EXPLANATION OF MAJOR DELIVERABLES

<b><i>Commissioning Test Procedures(CTP) for Process systems</i></b>	<i>Each Process system that is controlled by ICSS has to be commissioned following a CTP. This is developed by process engineer, with the assistance of Automation engineer.</i>
<b><i>MC Check/Test sheets</i></b>	<i>These templates provide the check/test lists to be followed during the site inspection of various items. These are prepared for each tagged item in the completions data base</i>
<b><i>PC Test sheets</i></b>	<i>These templates provide the test to be followed during the precommissioning stage of various items/loops. These are prepared for each applicable loop in the completions data base</i>



## BRIEF EXPLANATION OF MAJOR DELIVERABLES

<b><i>Commissioning Test Procedures(CTP) for ICSS</i></b>	<p><i>These are prepared based on the SAT procedures furnished by the ICSS vendors.</i></p> <p><i>It involves the procedure for carrying out the following activities and is done prior to the loop test activities</i></p> <ul style="list-style-type: none"><li>➤ <i>Installation checks</i></li><li>➤ <i>Powering up</i></li><li>➤ <i>Hardware testing</i></li><li>➤ <i>Software testing</i></li></ul>
<b><i>Commissioning Test Procedures(CTP) for Process systems</i></b>	<p><i>Each Process system that is controlled by ICSS has to be commissioned following a CTP. This is developed by process engineer, with the assistance of Automation engineer.</i></p>





# SAMPLE DELIVERABLES-LOOP TEST SHEET

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LOOP TEST SHEET				
System:		P&ID:		Project:
Loop Number	Description			
Alarm Settings	L =	LL =	H =	HH =
Actual alarm values	L =	LL =	H =	HH =
Alarms needing reset				
Post test statement				Signed
The loop is installed as shown on the P&ID and loop diagram			YES	NO
The loop will perform as designed			YES	NO
<b>Field Labelling</b>		OK - N/A	<b>Instrument</b>	
Motor push buttons			Air Isolation correct	
Motors			Accessible	
Control/On-Off Valves			Location correct per Loop diagram and P&ID	
Instruments and cabel			Input continuity check	
Orifice Plates			Calibration	
Junction Box			Range check with Control system	
Marshalling Cabinet			Loop direct/reverse action	
DCS/PLC Panel			Serial number correct	
Local Panels			State change OK on control system	
General electrical wiring			<b>Control- On/Off valves</b>	
Other			Position	0% = mA =
<b>MCC Room</b>			Position	25% = mA =
Starters and push buttons			Position	50% = mA =
Lighting suitable			Position	75% = mA =
Accessibility of terminations			Position	100% = mA =
Fuse/breaker lock box available			Valve positioner operates correctly	
Heating adequate			State change OK on control system	
Cooling adequate			Fail position checked	
Cabinet air fan acceptable?				
Labels on cabinet door correct			<b>Interlock tested</b>	
Wires labeled				
Cables labeled			<b>Documentation</b>	
Other			Interlock data on loop and P&ID correct	
<b>DCS and or I/O Room</b>			All loop diagram data correct	
DCS/PLC panels labelled			Master copy red lines for final mark up	
Termination panel access suitable			Control room has copy until as built issued	
Termination drawing suitable				
Fuse in place				
<b>Motor</b>				
Megged/rating				
Rotation				
State change OK on control system				
Signed for Instrument/Control / Electrical				Date
Signed for process				Date



**THANK YOU**

