



BUILD ELECTRONICS BETTER

# Workforce Training for Wiring Harness Operators

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# IPC Certifications

## > Certification Families

- CIS (Specialist)
- CIT (Instructor)
- CSE (Expert)
- CID (Designer)
- CEPM (Program Manager)

## > Standards

- 610, 001, 620, 600, 6012, and 7711/21

## > Certification Scope

- Assessment based validation
- Candidates understanding and utilization of an IPC standard

## > Offered In:

- Over 200 Countries
- 21 Languages

## > 2019

- 108K Certifications Globally

## > 2020

- ~95K Certifications Globally

# Gaps in the IPC Education Framework

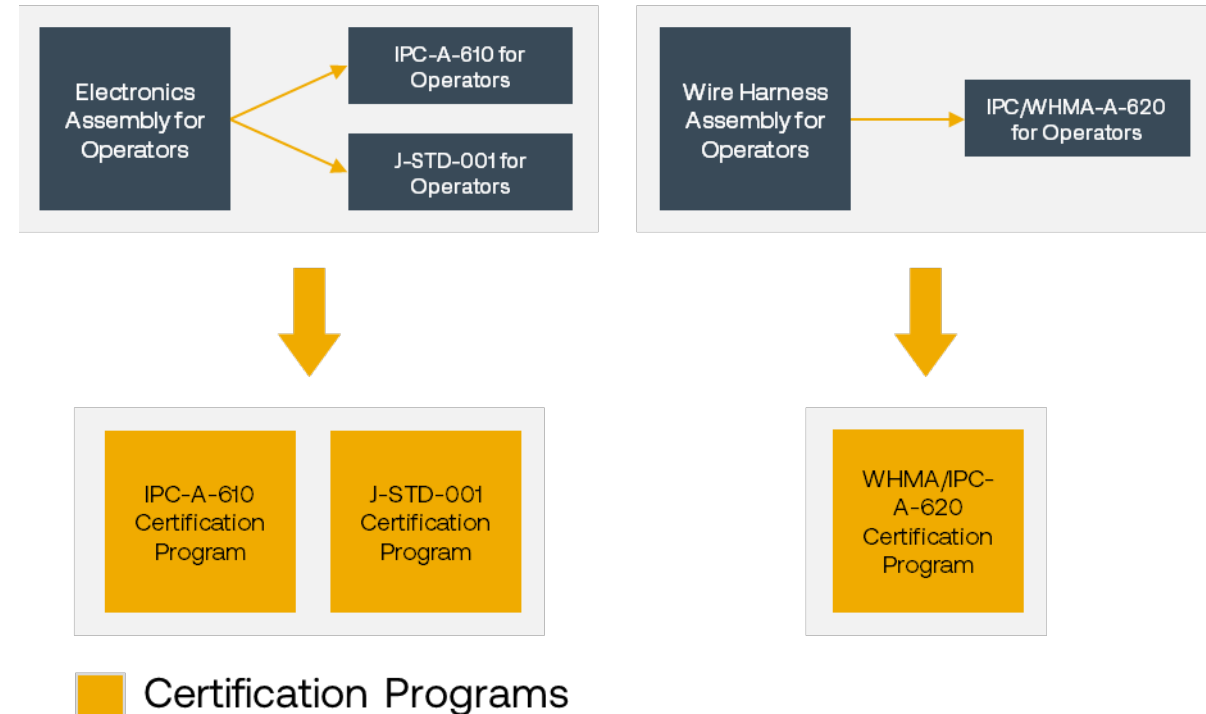


- > Lack of Basic Skills Training
  - Obtaining New Talent (Entry Points)
  - Retaining Talent (Career Progression)
- > Lack of Options for Organizations
  - Standardization of Certifications (One size fits all approach)
  - Operators to engineers taking the same program
- > How do Organizations Standardize knowledge and vocabulary?
  - Lack of baseline for job-based knowledge (like certification does for standard's-based knowledge)
- > Addressing Future and Emerging Needs

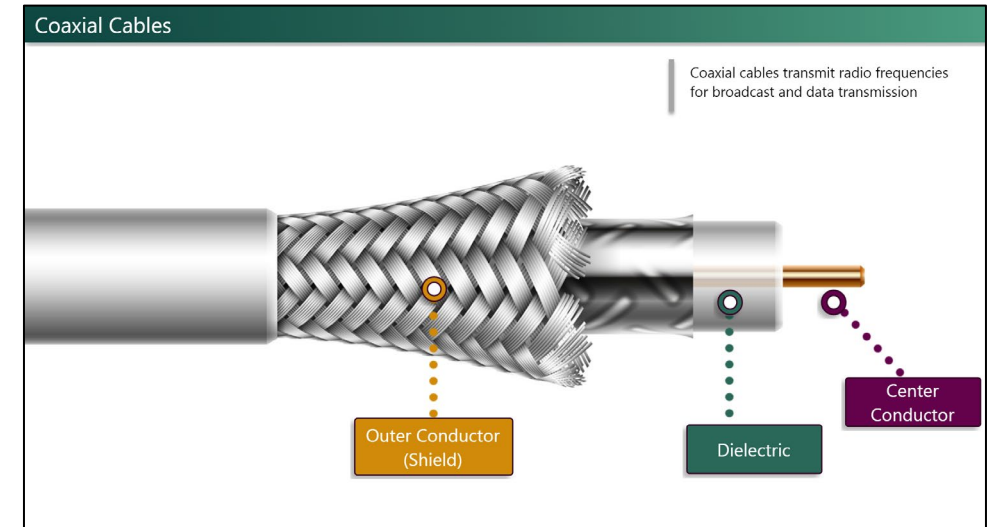
# Workforce Development Training Framework

- > Job-focused knowledge and skill development training programs
  - Industry and Data Driven
  - Fill existing gaps/ Address industry issues
  - Focus on outcomes
- > Goal:
  - Engaging, Efficient, and Effective Training
    - > Keep students interested in learning
    - > Reduce learning times (and cost)
    - > Increase learner retention
- > Career training programs integrated with IPC Certification Framework
  - Not every individual is ready for certification

## Workforce Training Courses



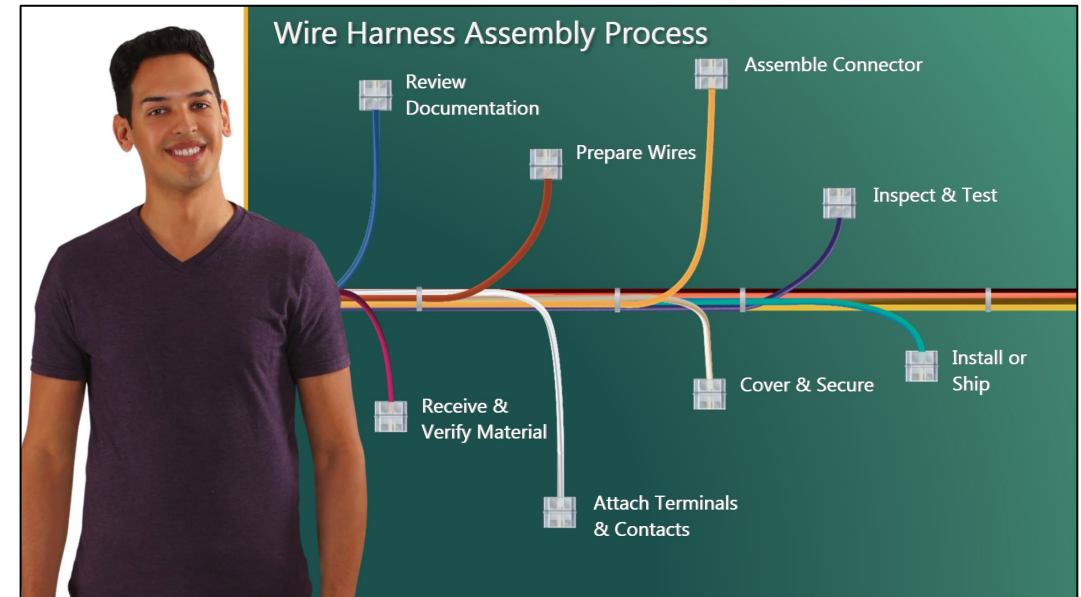
- > Designed and build through Industry partnerships
  - Identify knowledge and skills areas needing training (through ongoing customer discovery interviews)
  - Work with volunteer organizations to structure training program
  - Develop a content outline that is validated by industry
  - Jointly develop content for the program with A-Team
  - Reviewed by organization SMEs
  - Beta testing with organizations
    - > Instructors and students





## > Implementation Modalities

- Asynchronous Program
    - > Self-Paced
    - > Students complete program instruction online
  - Instructor-Led Program
    - > Materials provided to live instructor
    - > Students complete activities as a group and online
    - > Students complete assessments online
  - Hybrid Approach
- ## > Customized to organization's needs
- Required/ Optional Modules
    - > Required: General Knowledge
    - > Optional: Job Focused Knowledge



# Features

- > Engaging content delivered in an efficient manner
  - Micro-Learning approach
  - Videos, Interactives, Animations, etc.
  - Professionally narrated (Voice Actors)
  - Industry Supplied Visuals
- > Pre- and post assessments to measure learning
  - Instant user feedback
  - Retraining (when necessary)
- > Optional Hands-on Activities
- > Available 24/7
  - Almost all internet connected devices with browser

Practice Activity: Identifying Soldered Terminals

It's important to know the types of terminals you'll be working with. Click and drag to correctly label each image.

The screenshot shows four images of soldered terminals. The first image is labeled 'Cup', the second 'Slotted', and the third 'Bifurcated'. The fourth image is unlabeled. A red banner at the bottom indicates an incorrect answer: 'Incorrect Whoops! You didn't identify the soldered terminals correctly. Please click the Review button to review the slides about cables, and then click the Try Again button to attempt another answer.' Buttons for 'Try Again' and 'Review' are visible.

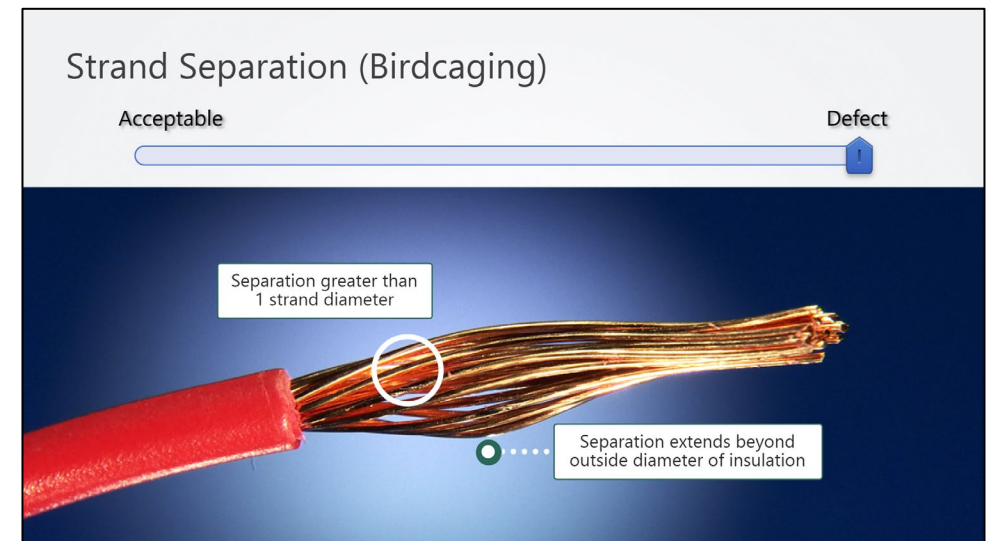
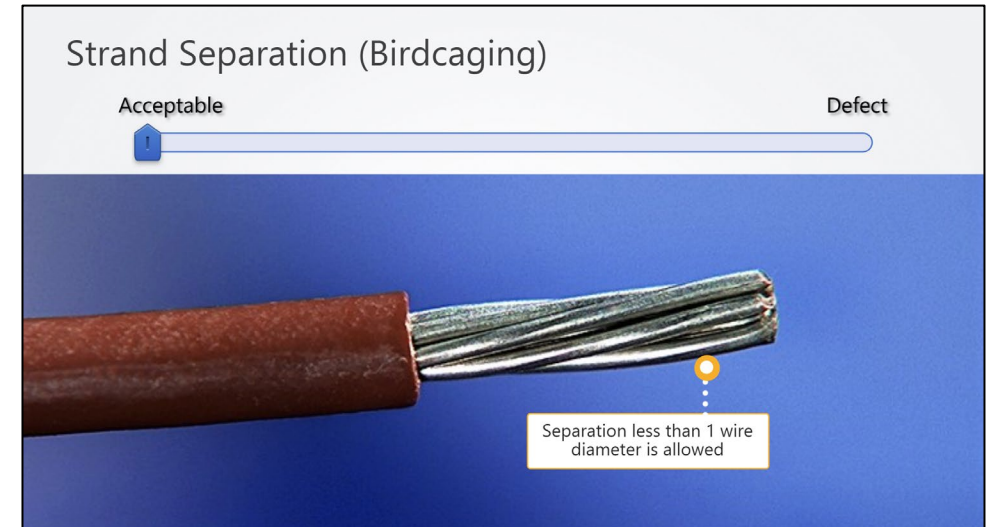
Practice Activity: Identifying Soldered Terminals

It's important to know the types of terminals you'll be working with. Click and drag to correctly label each image.

The screenshot shows a list of terminal types: Turret, Cup, Pierced, Bifurcated, Hook, and Slotted. The 'Turret' label is selected. A red banner at the bottom indicates an incorrect answer: 'Incorrect Whoops! You didn't identify the soldered terminals correctly. Please click the Review button to review the slides about cables, and then click the Try Again button to attempt another answer.' Buttons for 'Try Again' and 'Review' are visible.

# User-Centric Learning

- > Focused on the individual student vs group
  - Students progress at their individualized pace
  - Only progress to next section once learning has occurred
- > Active vs Passive Learning
- > Identify existing user knowledge
  - Focuses student time on areas of weakness
- > Internal instructor provides:
  - Guidance and Context
  - Individualize support to students
  - Organization specific knowledge





# Workforce Development Training

## > Operator Level Training

- Electronics Assembly for Operators\*
- Wire Harnesses for Operators\*
- 610, 001, and 620 for Operators Programs
- Soldering Fundamentals I

## > IPC Design Training Curriculum

- Live-Online Training (Project Based)

## > Coming Soon:

- PCB, Assembly, and Wire Harness Inspector and Tester programs

\*Will be available in English and Spanish

### Reflow Oven

- 4 temperature phases:
- Preheat:
  - Gradually raises temperature
  - Expels volatile solvents
  - Prevents thermal shock
- Soak:
  - Activates flux
  - Flux cleans leads, terminations and lands
- Reflow:
  - Solder paste melts and reflows
- Cooling:
  - Solder solidifies

### Four Temperature Phases

The diagram illustrates the four temperature phases of a reflow oven. The Preheat phase has three stages with temperatures 147, 151, and 171. The Soak phase has two stages with temperatures 181 and 217. The Reflow phase has two stages with temperatures 240 and 255. The Cooling phase has two stages with temperatures 52 and 50. The oven is shown with a color-coded temperature profile across its length, with the heating zone in red and the cooling zone in blue.

### Practice: SMT Defects

Match the name of the SMT defect with the correct image.

Below the images are four empty dashed boxes for matching. At the bottom, a box labeled 'Defects' contains four red buttons: Overhang, Adhesive in Termination, Tombstoning, and Billboarding.

# Electronics Assembly for Operators



Mandatory	Optional (Required to add at least one module)
<ol style="list-style-type: none"><li>1. Intro to Electronics Industry</li><li>2. Introduction to Printed Circuit Board Assembly</li><li>3. Overview of the Electronics Assembly &amp; Soldering Processes</li><li>4. Safety</li><li>5. ESD &amp; Product Handling</li><li>6. Component Identification</li><li>7. Drawings, Specifications &amp; Measurements</li><li>8. Basic PCA/PCB Defects</li><li>9. IPC Standards</li></ol>	<ol style="list-style-type: none"><li>10. Hand Soldering</li><li>11. SMT Technology</li><li>12. TH Technology</li><li>13. Wire and Cable Preparation</li><li>14. Wires &amp; Terminals Technology</li><li>15. Cables and Harness Technology</li><li>16. Hardware</li><li>17. Conformal Coating</li><li>18. Press Fit</li></ol>

16 – 20 Hours of Training

16 – 20 Hours of Training

# Wire Harness Operator



Mandatory	Optional (Required to add at least one module)
<ol style="list-style-type: none"><li>1. Introduction to Wire Harness Assembly</li><li>2. Safety</li><li>3. Engineering Documentation</li><li>4. Materials and Components</li><li>5. Tools and Equipment</li><li>6. Wire Preparation and Processing</li><li>7. Inspection and Testing</li></ol>	<ol style="list-style-type: none"><li>8. Crimp Terminations</li><li>9. Soldered Terminations</li><li>10. Splicing</li><li>11. Connector Assembly</li><li>12. Coaxial Cable</li><li>13. Labeling, Securing, and Covering</li><li>14. Finished Assembly Installation</li></ol>
<p>12– 16 Hours of Training</p>	<p>12– 16 Hours of Training</p>

# WHO Beta Testing Update



- > Beta running through end of February/  
Beginning of March
- > 11 Organizations Participating in Beta Testing Program
  - Supervisors/ Instructors and Operators
- > WHMA member companies that attend this virtual conference live will receive a complimentary course registration (one per company) so one of their employees can experience this new program firsthand.

- > Feedback from Users:
  - “I have been working with wire harnesses for 3.5 years and this was extremely informative and taught me things I didn't know. The info is very useful and answered questions I've had but couldn't get answered.”
  - “Narrator is clear and concise. Explanations and examples used are relative to daily life. Interactives keeping student's alert.”
  - “I really like the safety module that you have added, This is a great thing for employees that are just getting into the wire harness business, I believe that this is very helpful. I have enjoyed the videos and the ability to check your progress or answers in the first 2 modules.”

# Wire Harness Operator Certificate



Certificate not Certification (Similar to a Diploma)

User's Name

Only Lists Modules Completed

Valid for Two Years/ Refresher or CE Training

Unique ID/ Validation



## CERTIFICATE OF QUALIFICATION

*User41 Lastname4*

### Completed Required Modules

- 1: Introduction to Wire Harness Assembly
- 2: Safety
- 3: Engineering Documentation
- 4: Materials and Components
- 5: Tools and Equipment
- 6: Wire Preparation and Processing
- 7: Inspection and Testing

### Completed Optional Modules

- 8: Crimp Terminations
- 9: Soldered Terminations
- 13: Labeling, Securing, and Covering
- 14: Finished Assembly Installation

having successfully completed the IPC Assembly Operator Training Program is hereby designated as:

## Qualified IPC Wire Harness Assembly Operator

February 3rd, 2021

Completion date

February 2023

Expiration date



Professional Development Hours 22

VP of Education

WHAO-21020346521



# Live Demo



# Contact Information



If you have any questions or if you would like to participate in future programs, please contact us:

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# Thank you!

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