



Compression Connections and Cloud Based Technology



Compression Connections and Cloud Based Technology

George B. Robertson
Thomas & Betts
and
Marc Licata
Thomas & Betts

**This session is eligible for
1 Contact Hour.**

For these hours to appear on your certificate, you must:

- Have your badge scanned at the door
- Attend 90% of this presentation
- Fill out the online evaluation for this session: www.necanet.org/neca2018

Agenda

- Crimp History
- Crimp Anatomy
- Smart Tool+ Mechanics
- RFID Tagged Lug Mechanics
- Mobile Application Benefits
- The Cloud


History of the Crimp

- Prior to Compression the industry used Mechanical Lugs



"TITE-BIND" [See pages 7 and 8]
"TITE-BIND" Lugs are precision made for specific sizes of conductors whether they be solid or stranded wires, tubing or solid rod. When you buy "TITE-BINDS", you get the benefit of the highest engineering standards—a perfect and permanent electrical connection.
"TITE-BINDS" are smooth and neat in appearance and, because of their streamlined design, are easy to tape.

"LOCK-TITE" [See pages 33 through 38]
"LOCK-TITE" Lugs take a wide range of sizes—7 lugs take all cables (any type) from No. 4 to 1000 MCMIL. Because of this they simplify your service or maintenance problems. "LOCK-TITES" also provide for the many instances where wire or cable sizes cannot be determined in advance.
The socket screw and key wrench assure positive tightening on all types of conductors including extra flexible or welding cable.



"WEDGE-ON" [See pages 49 through 70]
"WEDGE-ON" Lugs are precision made for specific sizes of wires (from the smallest up to No. 4). They make a positive, mechanical joint. Connections are permanent and vibration proof. Once you install a "WEDGE-ON" on a wire, it becomes a part of the wire itself.
"WEDGE-ONS" hold and support the insulation, thus protecting the conductor against breakage in case of flexing or vibration.

"LUG-IT" [See pages 39 and 40]
"LUG-ITS" feature a range of sizes—two sizes of "LUG-ITS" handle twelve wire sizes (from No. 14 solid up through No. 4 stranded). They can be used over and over again.
The curved, floating saddle assures inclusion of all strands and even pressure with maximum conductivity. "LUG-ITS" are easily installed with an ordinary screw driver.

- The lugs required tight tolerances and extensive machining.
- Aviation, where a loose connection could be catastrophic, drove innovation.

History of the Crimp

- The compression lug was born.
- An irreversible alternative to mech.
- A unique die profile was required for each wire.
- T&B innovated the T&B Method, where the die number was embossed on the lug for easier inspection.
- Still, installers would mismatch lugs and dies.

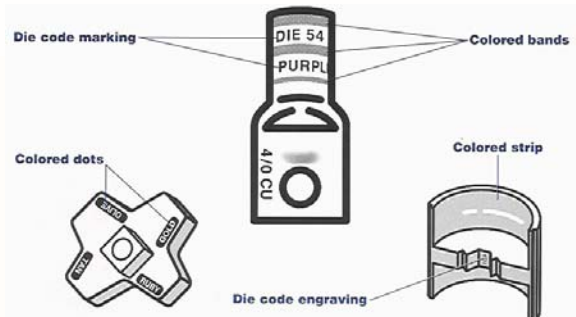


5

NECA 2018
TECHNICAL WORKSHOP 

History of the Crimp

- Problem solved by the invention of the Color-Keyed system
- This new system created a Color Coding system with matching colors on lug barrels and associated dies.
- Today it's an industrial standard
 - 250 MCM is **Yellow**
 - 4/0 is **Purple**
 - 350 MCM is **Red**



6

NECA 2018
TECHNICAL WORKSHOP 

Anatomy of a Crimp (Crimping Mechanics)

- Conductor sized to carry desired electrical load
 - Conductor size defined by cross sectional area, .ie. AWG or KCMIL
- Compatible connector (lug) size recommended by mfg.
 - Connector identified by conductor size
- Conductor preparation
 - Insulation strip length recommended by mfg to allow full insertion into connector



7

NECA 2018
TECHNICAL WORKSHOP 

Anatomy of a Crimp (Crimping Mechanics)

- Compression of connector and conductor to achieve a nearly homogeneous mass.



Before
compression



After
compression

- Validation testing based on UL 486 A/B
 - Minimum pull force based on cable size
 - Maximum allowed temperature rise above ambient when energized = 50°C

8

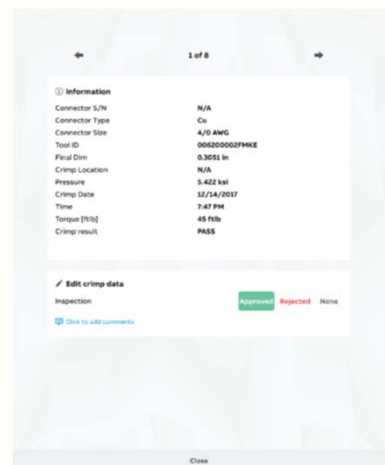
NECA 2018
TECHNICAL WORKSHOP 

Improving the Crimp



9

More Than Just a Crimp



10

The Crimp Tool

- Dieless
- Faster
- Backward compatible



11

NECA 2018
TECHNICAL WORKSHOP 

The Crimp Tool

- Provides feedback
- Monitors more than pressure
- Collects crimp data
- Wireless data transfer



12

NECA 2018
TECHNICAL WORKSHOP 

RFID Technology

- Radio Frequency Identification
- Functionality with low or no internal power
- Storage and transmission of data
- Multiple data points



13

NECA 2018
TECHNICAL WORKSHOP 

RFID Technology

- Serialized connectors
- Automatic crimp settings
- Minimize errors



14

NECA 2018
TECHNICAL WORKSHOP 

Mobile Software Solution

- Data is always available
- Move data quickly and easily



- No USB Port to fail
- No wires required

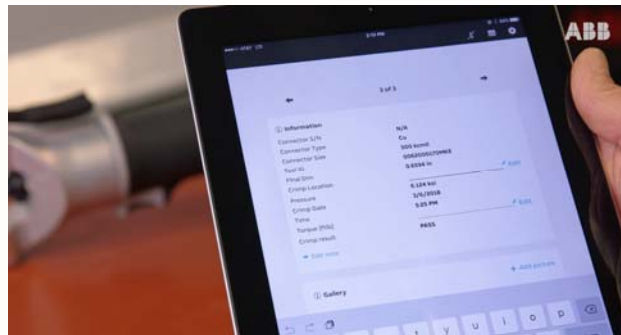


15

NECA 2018
TECHNICAL WORKSHOP 

Mobile Software Solution

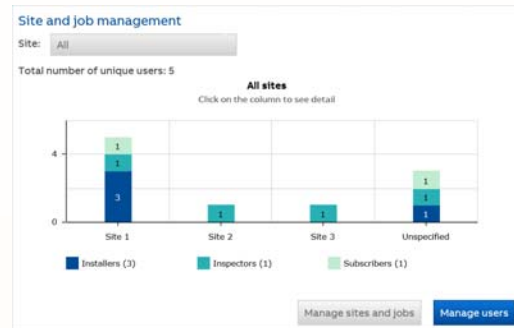
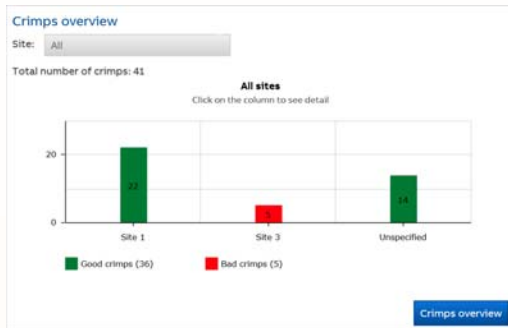
- Control access to sites & jobs
- Instant analysis
- Track user output



16

NECA 2018
TECHNICAL WORKSHOP 

Data Organization



Data Organization

Select	Connector	Tool ID	Date
<input type="checkbox"/>	S/H: 6009DF93AD05 Type: Cu Size: 4/0 AWG Final Dim: 0.36 in Pressure: 4.97 ksi	00620001D3MKE	2018-08-20 19:51
Installer	Site	Job	Crimp location
John Doe	East Side Treatment Plant	Clarifier Switchgear	back room
Torque	Crimp result	Updated	Approval
25 ftlb	Good	2018-08-20 20:09 John Doe	
Actions			

Data Organization

SerialNumber	Type	Size	FinalDiameter	Pressure	ToolId	Date	Installer	Site	Job
6A983A020003	Cu	350 kcmil	0.4388 in	0.559 ksi	006200008EMKE	2018-08-29 21:17	John Doe	West Side Treatment Plant	Generator 6
RFID340041	Al	2/0 AWG	0.483 in	2.203 ksi	TestTool1200384	2018-09-08 16:40	John Doe	West Side Treatment Plant	Generator 6
RFID340050	Al	600 kcmil	1.055 in	3.884 ksi	TestTool1200384	2018-09-08 16:50	John Doe	West Side Treatment Plant	Generator 6
RFID340118	Al	350 kcmil	0.772 in	3.153 ksi	TestTool1200384	2018-09-08 17:00	John Doe	West Side Treatment Plant	Generator 6
RFID340135	Al	400 kcmil	0.904 in	3.511 ksi	TestTool1200384	2018-09-08 17:10	John Doe	West Side Treatment Plant	Generator 6
RFID340055	Al	2/0 AWG	0.483 in	2.203 ksi	TestTool1200384	2018-09-08 17:20	John Doe	West Side Treatment Plant	Generator 6
RFID340125	Al	4/0 AWG	0.512 in	2.622 ksi	TestTool1200384	2018-09-08 17:30	John Doe	West Side Treatment Plant	Generator 6
RFID340046	Al	600 kcmil	1.055 in	3.884 ksi	TestTool1200384	2018-09-08 17:40	John Doe	West Side Treatment Plant	Generator 6
RFID340133	Al	600 kcmil	1.055 in	3.884 ksi	TestTool1200384	2018-09-08 17:50	John Doe	West Side Treatment Plant	Generator 6
RFID340103	Al	400 kcmil	0.904 in	3.511 ksi	TestTool1200384	2018-09-08 18:00	John Doe	West Side Treatment Plant	Generator 6
RFID340076	Al	1/0 AWG	0.478 in	1.918 ksi	TestTool1200384	2018-09-08 18:10	John Doe	West Side Treatment Plant	Generator 6
RFID340107	Al	600 kcmil	1.055 in	3.884 ksi	TestTool1200384	2018-09-08 18:20	John Doe	West Side Treatment Plant	Generator 6
RFID340029	Al	2/0 AWG	0.483 in	2.203 ksi	TestTool1200384	2018-09-08 18:30	John Doe	West Side Treatment Plant	Generator 6
RFID340027	Al	400 kcmil	0.904 in	3.511 ksi	TestTool1200384	2018-09-08 18:40	John Doe	West Side Treatment Plant	Generator 6
RFID340059	Al	3/0 AWG	0.489 in	2.431 ksi	TestTool1200384	2018-09-08 18:50	John Doe	West Side Treatment Plant	Generator 6
RFID340124	Al	600 kcmil	1.055 in	3.884 ksi	TestTool1200384	2018-09-08 19:00	John Doe	West Side Treatment Plant	Generator 6

What is the Cloud?

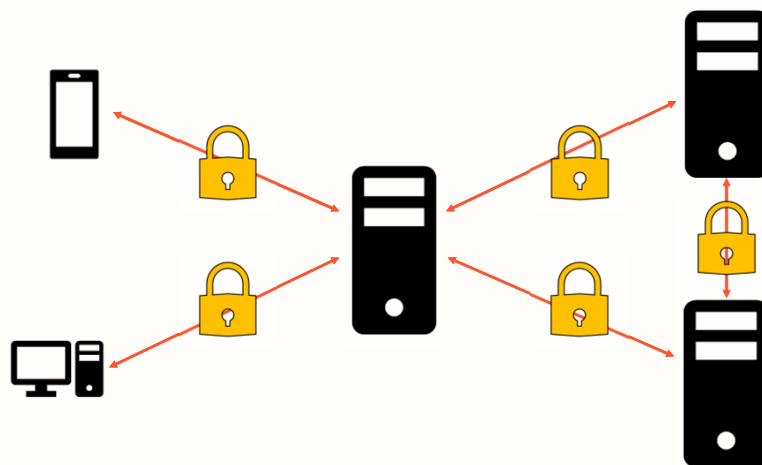


The Cloud



Photo by [Renato Cerqueira](#)

The Cloud



The Cloud

- Software and services that run on external servers
 - Remote access anywhere
 - Provides collaboration
 - Simple to organize
 - Easy to restore data if lost or destroyed

23

NECA 2018
TECHNICAL WORKSHOP 

Questions?

For more Information:
Visit us in Booth #207

24

NECA 2018
TECHNICAL WORKSHOP 