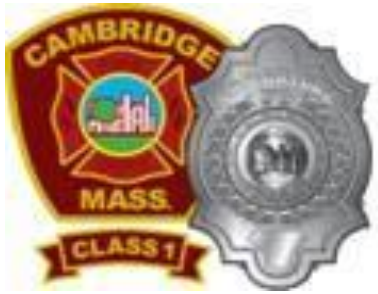
DFS Battery Symposium

10-13-2023



SFPE New England

AFAA New England

AGCMA Building Excellence

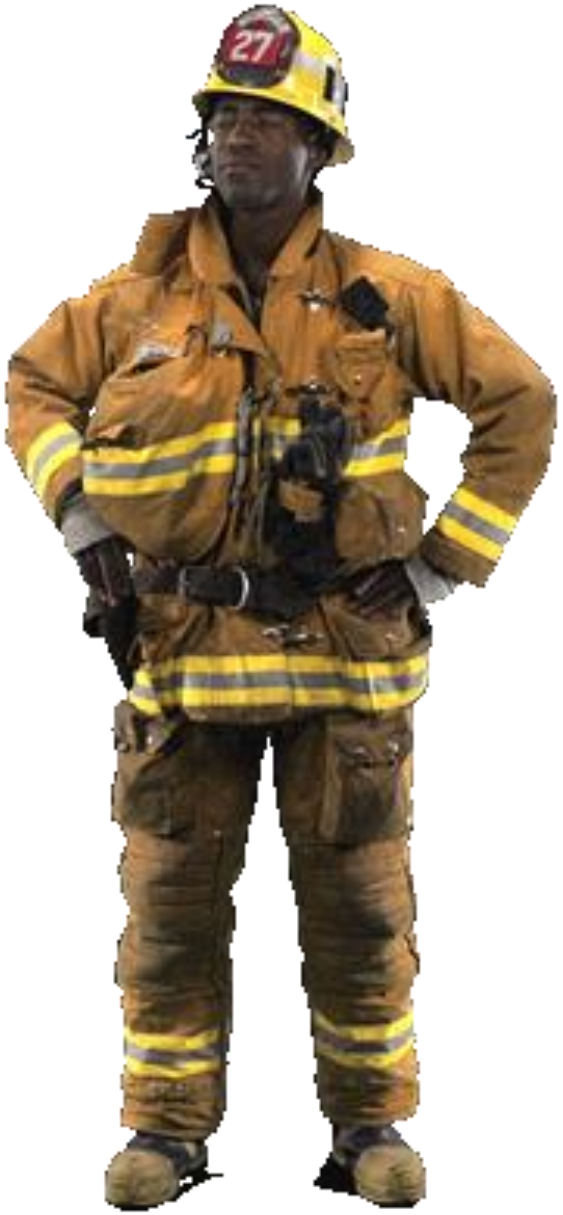
Woburn Electrical School of Code & Theory

CONSTRUCTION FIRE SAFETY COALITION

NFSA
NATIONAL FIRE SPRINKLER ASSOCIATION
The Voice of the Fire Sprinkler Industry

MA Board of Elevator Regulations

ASME A.17 Emergency Operations



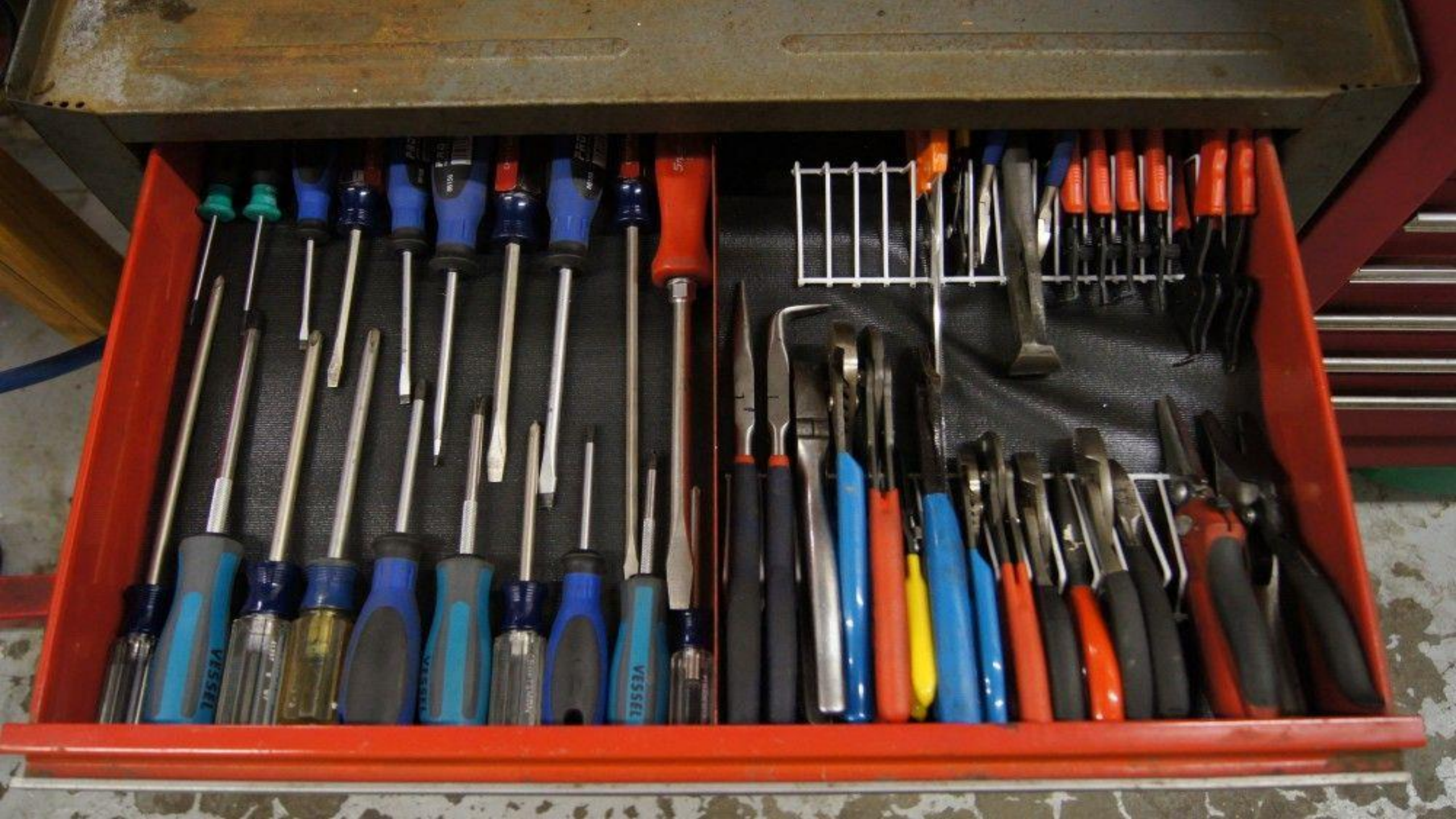
- Opinions, perspectives and comments
- Cannot cover everything
- More questions then answers
- Nothing intended to be contentious

Disclaimer

- No central location for finding information
- Technology is far advanced
- Battery saturation
- Word is spreading

Codes and Standards Process

- By no means perfect or as accurate as we would like
- Written by individuals and not organizations, so get involved if you want change
- Developed as a consensus of best practices, high technical aspects, good ideas with numerous negotiations and finalized by voting
- Drafted years before publication
- Adoption is a slow process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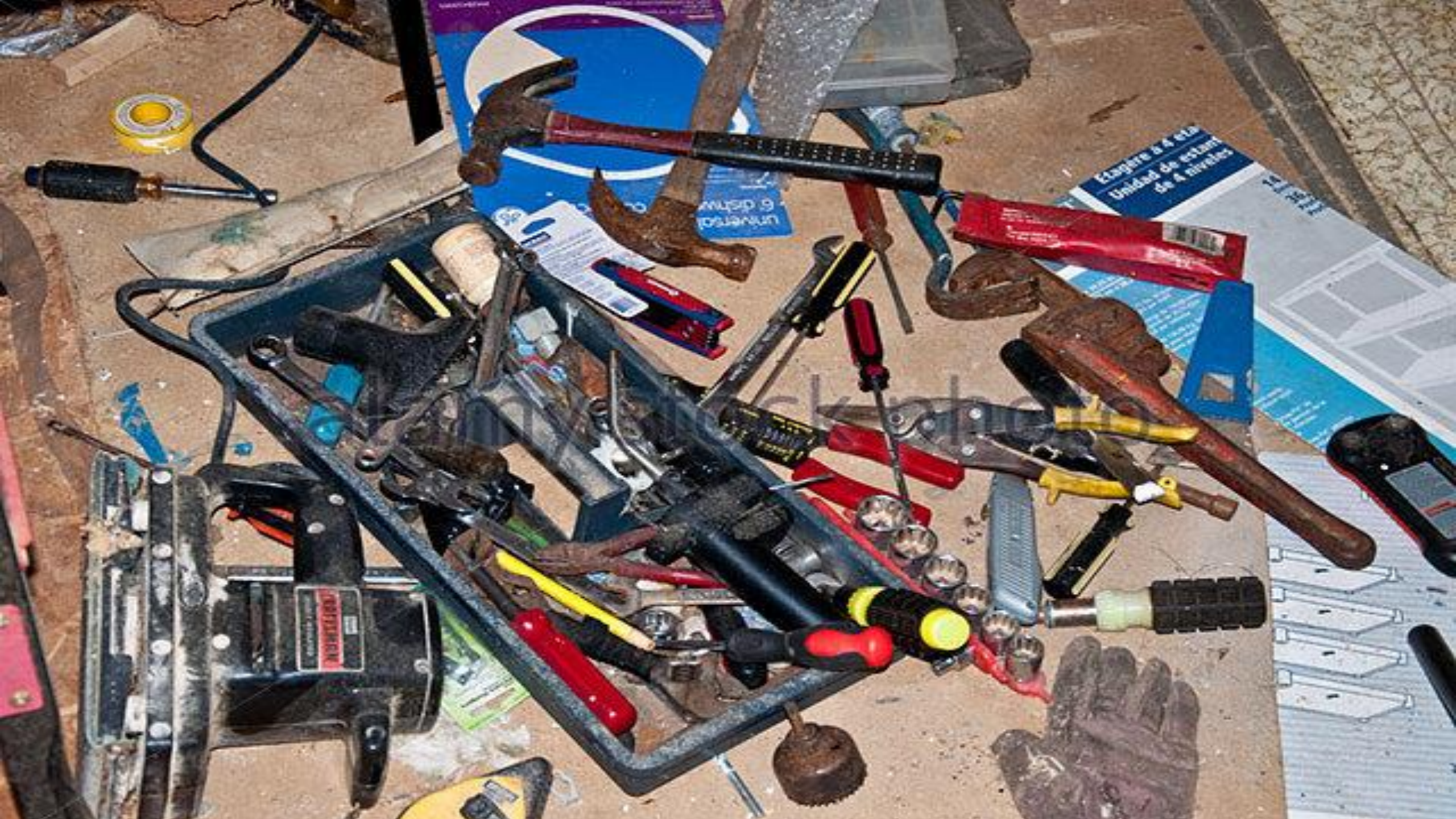
Estantería de 4 estantes
Unidad de estantería
de 4 niveles

History

- Numerous incidents globally (South Korea, Islands of Samoa and Hawaii) impacted progress and lives making a push for fire testing
- The California Energy Alliance called upon the National Fire Protection Association (NFPA) to address gaps between workshops run by the Department of Energy and the Fire Protection Research Foundation

Evolution of Regulation

- In 2016 a project to create the NFPA 855 Standard for the Installation of Energy Storage Systems was launched
- The 2015 NFPA 1 Chapter 52 and 2015 NFPA 853 Standard for the Installation of Stationary Fuel Cell Power Systems were used as the model
- Development was delayed approximately eighteen months due to electric utilities
- Regulations are minimal collective safety intentions


Follow the
Bouncing Ball...

Evolution of NFPA Regulation

- The 2003 NFPA 1 Chapter 52 Stationary Lead Acid Battery Systems
  - Carried through in the 2006 and 2009 editions
- The 2012 changed the title to Stationary Storage Battery Systems
  - Carried through in the 2015 edition
- The 2018 changed the title to Energy Storage Systems
  - Carried through in the 2021 edition
- In 2020 the first edition of NFPA 855 was released
- In 2023 the second edition of NFPA 855 was released
- Currently there is work taking place for the next edition
- Tons of annex material

Evolution of IBC Regulation

- The 2018 IFC section 1206 (mirrors NFPA 855)
  - MA missed this edition
- The 2018 IRC section R327 (mirrors NFPA 855)
  - MA missed this edition
- The 2021 IFC section 1207 (mirrors NFPA 855) and should appear in the adoption of the 10 edition of 780 CMR
- The 2021 IRC section R328 (mirrors NFPA 855) and should appear in the adoption of the 10 edition of 780 CMR
- The 2024 editions are expected to point directly to 855

Evolution of MA Regulation

- MA previously adopted the 2012 and 2015 NFPA 1 and nobody baulked at the Chapter 52
- MA adopted the 2018 Chapter 52 in October 2019
- MA made two significant additions
  - Permit
  - 1&2 family
- MA produced two guidance documents in May and June of 2021 to address small systems

Evolution of UL Regulation

- NFPA 855 relies heavily on UL Standards
  - UL 1642 - Cells
  - UL 1973 - Battery
  - UL 1974 - Repurposed Batteries
  - UL 1741 - Inverter
  - UL 9540 - Entire System (3rd edition)
  - UL 9540A - Thermal Runaway (5th edition)
- Not everything needs to be listed. Non listed parts can be used to achieve a listing for a system

Other NFPA Regulations (not suppression or alarm)

- NFPA 68 Standard for Explosion Protection by Deflagration Venting
- NFPA 69 Standard on Explosion Prevention Systems
- NFPA 70 NEC
  - Chapter 706 ESS
  - Chapter 480 Batteries
  - Chapter 690 PV
  - Chapter 705 Interconnections

In a nutshell

- UL 9540 evaluates the entire ESS for safety
- UL 9540A compliments 9540 to help understand and mitigate risks
- NFPA 855 bridges UL standards to provide installation guidance with best practices
- The irony here is that the ESS is supposed to be designed to consume itself

Inspections

- Validation of permitted construction documents per 855
- Access
- ERP/EAP/On-site personnel/SDS
- Commissioning and decommissioning plan
- Detection, suppression, controlling systems
- Shutdown procedures
  - Sensitive to secretive technology
- Handover


WHY?
HOW
WHAT?
WHO?
WHEN?
WHERE?