SEMICONDUCTOR INDUSTRY ASSOCIATION

SIA Fire and Building Standards (FABS) Committee
Summary of Accomplishments

Charter of SIA FABS Committee

The Semiconductor Industry Association (SIA) Fire and Building Standards (FABS) Committee has been involved in the Building and Fire Code Development processes for 30 years. The SIA FABS Committee was the original sponsor of the Uniform Fire and Building Code regulations (including the development of Article 80, Hazardous Materials), and these regulations defined how a fabrication facilities were to be constructed and operated safely, throughout the world.

The SIA FABS Committee monitors the code change processes, submits code changes, reacts to code changes by others and represents the industry. Ensure that new Building and Fire Codes:

Do not compromise safety
Do not increase fab costs
Increase or maintain flexibility
Meet new technology needs in the code

In the past, the SIA FABS Committee has monitored the code change processes, submitted code changes, reacted to code changes by others and represented the industry in the development of the following Codes:

International Fire Code (IFC)
International Building Code (IBC)
International Mechanical Code (IMC)
International Plumbing Code (IPC)
International Energy Conservation Code (IECC)
International Green Construction Code (IgCC)
International Fuel Gas Code (IFGC)
Uniform Mechanical Code (UMC)
Uniform Plumbing Code (UPC)
National Fire Prevention Association Fire Code (NFPA 1)
NFPA Hazardous Materials Code (NFPA 400)
NFPA Building Construction and Safety Code (NFPA 5000)

These codes and standards are adopted and enforced by state and local governments throughout the United States and used throughout to world to help insure safe facilities and operations. They are also relied upon as the basis for design of facilities by architects and engineers.

Summary of Recent Activities:

2019-2020

Developed SIA Code Proposals to International Code Council for 2021-2024 code cycle:

1. Increase egress travel distance from 200’ to 300’ based on 3rd party egress modeling verifying no decrease in safety risk to occupants.

2. Aligning the density table in IFC CH 27 with the current NFPA 318 to double allowance of hazardous materials in fabs based on determination by code, emergency response, and process safety experts.
3. HazMat density limit calculation clarification.
4. HPM Storage limit proposal to solve code inconsistency that penalized fabs.

2018:

Successfully proposed changes to the International Fire Code and NFPA 55 to allow unlimited storage of pyrophoric gases based on industry robust controls and safety records. This removed the required for detached storage when >2000 cu ft of gas was exceeded.

Summary of Past Impacts:

SIA proposals that have been adopted into the model codes that have had major impact on the industry included:

- Increase the aggregate quantity of flammable, pyrophoric, toxic and highly toxic gases to 9000 cubic feet or a density of 0.2 ft^3 per ft^2
- Eliminated redundant requirement for exhaust ventilation to chemical rooms to be 6 air changes per hour in addition to the standard 1 cf,/ft2, which penalized high ceiling rooms needed for the industry.
- Deleting HPM flammable liquids from the code resulting on increased tool quantities.
- Establishing ventilation requirements that allowed safe use of hazardous material in large volume spaces.
- Extending travel distance to an exit from 100 feet to 200 feet. As a result perimeter corridors could be eliminated, production areas increased, and construction costs reduced.
- Allowing unclassified electrical throughout the fabrication area by allowing the use of re-circulation air, resulting in reduced ventilation costs and layout flexibility.
- Allowing combustible material in the under floor and ceiling plenum spaces, resulting in the ability of use the materials necessary for operation and reducing cost of fire sprinkler installation.
- Increasing the height of a facility from 3 to 4 stories resulting in the ability to construct current designs.
- Numerous increases in the types and allowable amounts of hazardous materials in the fabrication facility and at the workstation thus allowing in new processes and larger wafers.
- The regulations were ultimately adopted into the International family of codes form the three legacy codes (Uniform, BOCA and SBCCI) resulting in uniform application nationwide and a smooth transition to the new body of regulations.
- The regulations that were incorporated into the NFPA 5000 Building and Safety Code with the same result as above.
- Allowing for travel through intervening hazardous occupancies that allowed workstations and HPM rooms to exit through the fabrication space.
- Allowing for two story openings which resulted in ability to do flow through ventilation.
- Limiting the exhaust ventilation requirement in fabrication area to only those areas where HPM is use or stored thus reducing ventilation rates for fan attics and support spaces.

Other approved code changes submitted by SIA included:

- Established emergency power fuel supply limits
- Modifying HPM piping and tubing requirements including allowing transverse crossings of the corridors.
- Establishing testing requirements for alarms and safety systems.
- Establishing emergency planning requirements.
- Clarification of gas detection requirements.
- Allowing outdoor weather protection without complying with all the requirements for interior storage.
- Deleting the storage separation requirements unique to the semiconductor industry.
- Establishing hazardous exhaust duct penetration allowances.
- Eliminating exempt amount limitations for storage in fabrication areas.
- Exempting fabrication areas from the ozone generating equipment requirements.
- Changing the number of gas cylinders allowed at a workstation from three to a quantity that allowed SAGS to be used.
- Elimination of the 5.3-gallon limitation on workstation container size.
- Elimination of fire code workstation clearance requirement.
- Allowing limited amounts of HPM transportation in exit corridors with controls
- Referencing CGA standard for classification of mixtures.
- Increasing the allowable dead-end exit in semiconductor occupancies from 20 feet to 50 feet.

Code changes by others that SIA supported and were adopted included:

- Allowing unlimited area H5 buildings for any construction type, with 60-foot side yards saving SIA members significant costs.
- Increasing the occupant load for H occupancies which resulted in the elimination of two exits for all rooms greater than 200 square feet impacting space utilization and perimeter support rooms.
- Reducing the requirement for explosion control for water reactive 2 materials to only when the material can form explosive mixtures.
- Reducing required exit travel distances for all hazardous occupancies.
- Establishing hazardous material storage requirements.
- Removing smoke detection requirements for oxidizers.
- Removing smoke and heat vent requirements.
- Establishing fire alarm requirements.
- Establishing fire sprinkler requirements.
- Modifying the controls for the various hazardous materials.
- Establishing hazardous material gases and liquid valve shut-down controls.
- Modifications to hazardous materials inventory statements.
- Establishing CGA13 silane requirements.
- Allowing electronic MSDSs.

Code Changes by others that SIA opposed and were disapproved included:

- Prohibiting fabrication facilities in 500-year flood zones in earthquake prone regions which would have eliminated new construction and remodeling of facilities in the Northeast and West.
- Prohibiting return air plenums above and below the floor of a fabrication area and requiring that all air be ducted.
- Increasing fire separation ratings between occupancies.
- Limiting area for the different types of construction.
- Requiring ducts that contain hazardous material to be enclosed in one-hour construction.
- Increasing exterior wall fire ratings.
- Increasing structural design calculations for hazardous occupancies.
- Requiring community notification and evacuation for spill of any amount of hazardous materials.
- Elimination of Factory Mutual standard for plastic in workstations and tools use by the semiconductor industry.
- Excessive spill containment requirements.
- Additional tank inspection and maintenance requirements.