AFSL American Fireworks Standards Laboratory

AFSL
General Membership Meeting

September 29, 2022

American Pyrotechnics Association Convention and Annual Meeting

Kansas City, MO

AFSL American Fireworks Standards Laboratory

Agenda

- Board of Director's Report – Mike Ingram, AFSL Board President
- Election of Directors – Jay Howell, Executive Director
- Financial Report – Jason Trout, Treasurer
- Award Presentations – Mike Ingram, AFSL Board President
- Consumer Fireworks Testing Program – Jay Howell, Executive Director
- Current Failure Trends in Consumer Fireworks – Chuck Rogers, BV Americas Director
- 15-minute BREAK
- Regulator Engagement and Training Activity – Jerry Wingard, Director of Standards and Compliance
- Domestic Injury Surveillance and Standards Activity – Jerry Wingard, Director of Standards and Compliance
- Emerging Producer Market Overview - Brazil – Jay Howell, Executive Director
- Election Results – Jay Howell, Executive Director
- Closing Remarks – Mike Ingram, AFSL Board President

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Board of Directors' Report

Mike Ingram – President, AFSL Board of Directors

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Election of Directors

Jay Howell – Executive Director

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2022 Candidates for AFSL Board of Directors

- Consumer Fireworks Importer, Distributor, Retailer Category
  - Mike Collar – Winco Fireworks International
  - John Walker – Spirit of ‘76
- Consumer Fireworks Shipper Category
  - Thomas Chan – United Pyrotechnics USA Inc.
- Display Fireworks Category
  - Phil Grucci – Fireworks by Grucci

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Financial Report

Jason Trout - Treasurer

Distinguished Service Awards

Mike Ingram – President, AFSL Board of Directors

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Consumer Fireworks Testing Program and China Report

Jay Howell – Executive Director

William Zhou – China Operations Manager

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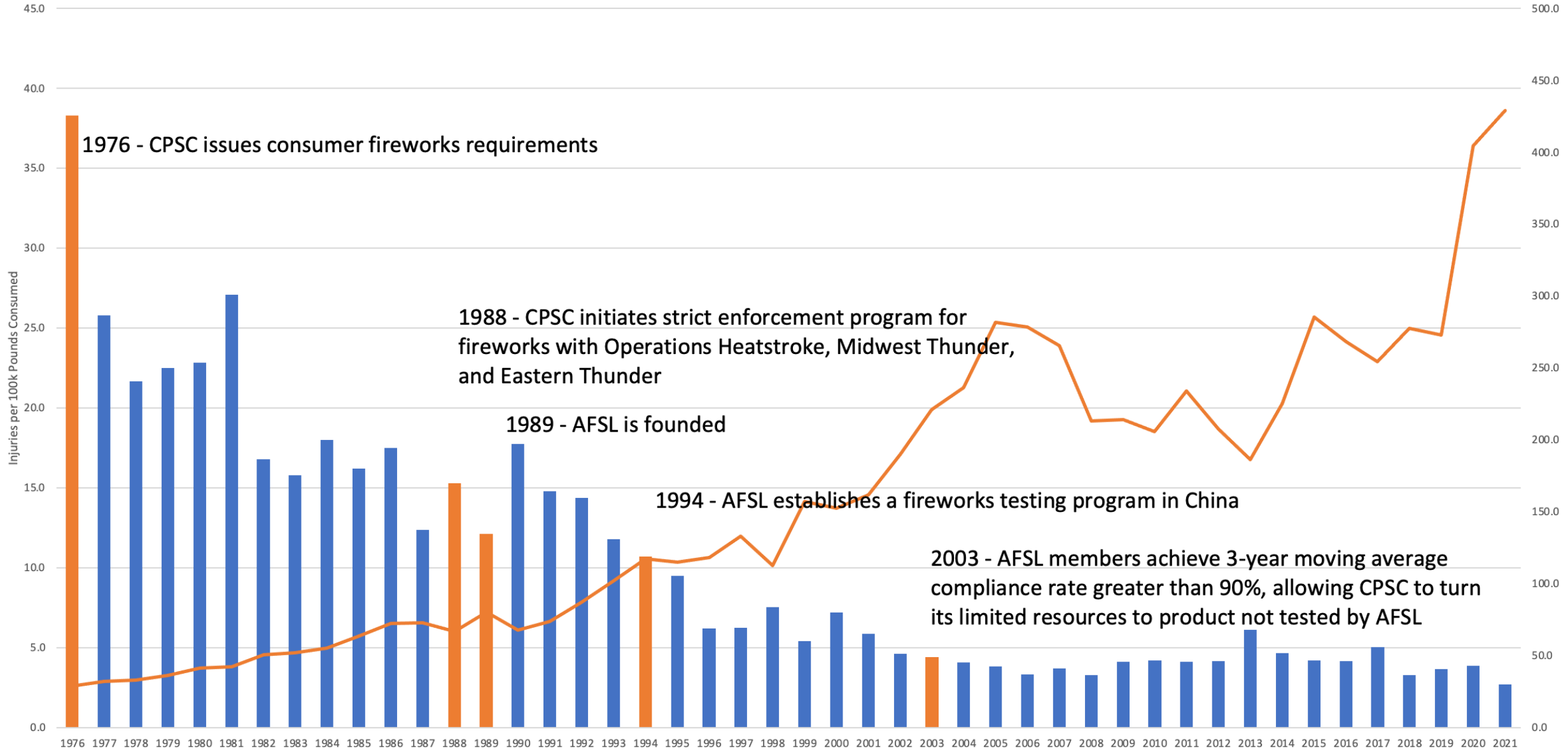
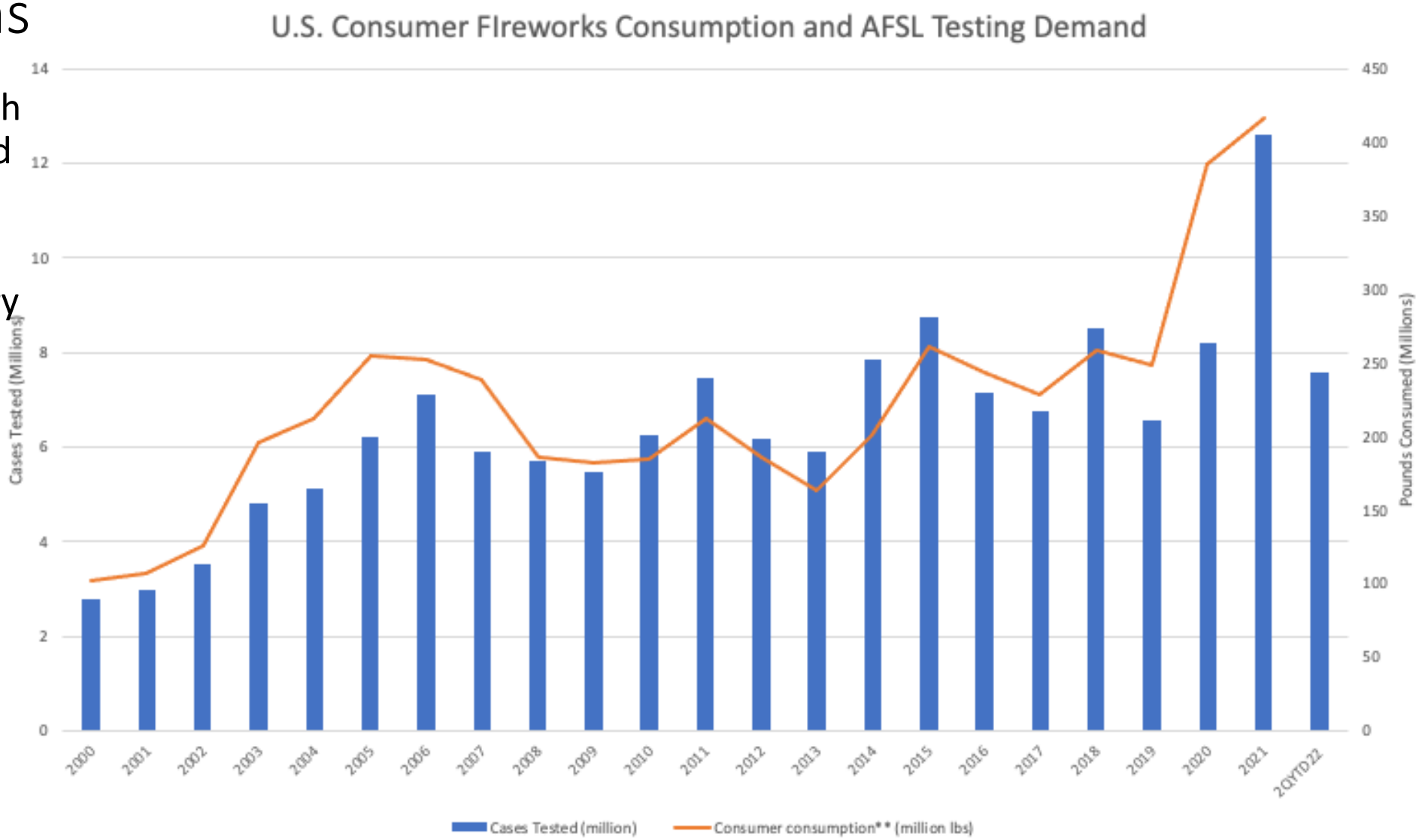
Fireworks-Related Injury Rates Drop as U.S. Consumption Grows



Data Sources: APA U.S. Fireworks Consumption Figures and U.S. CPSC NEISS

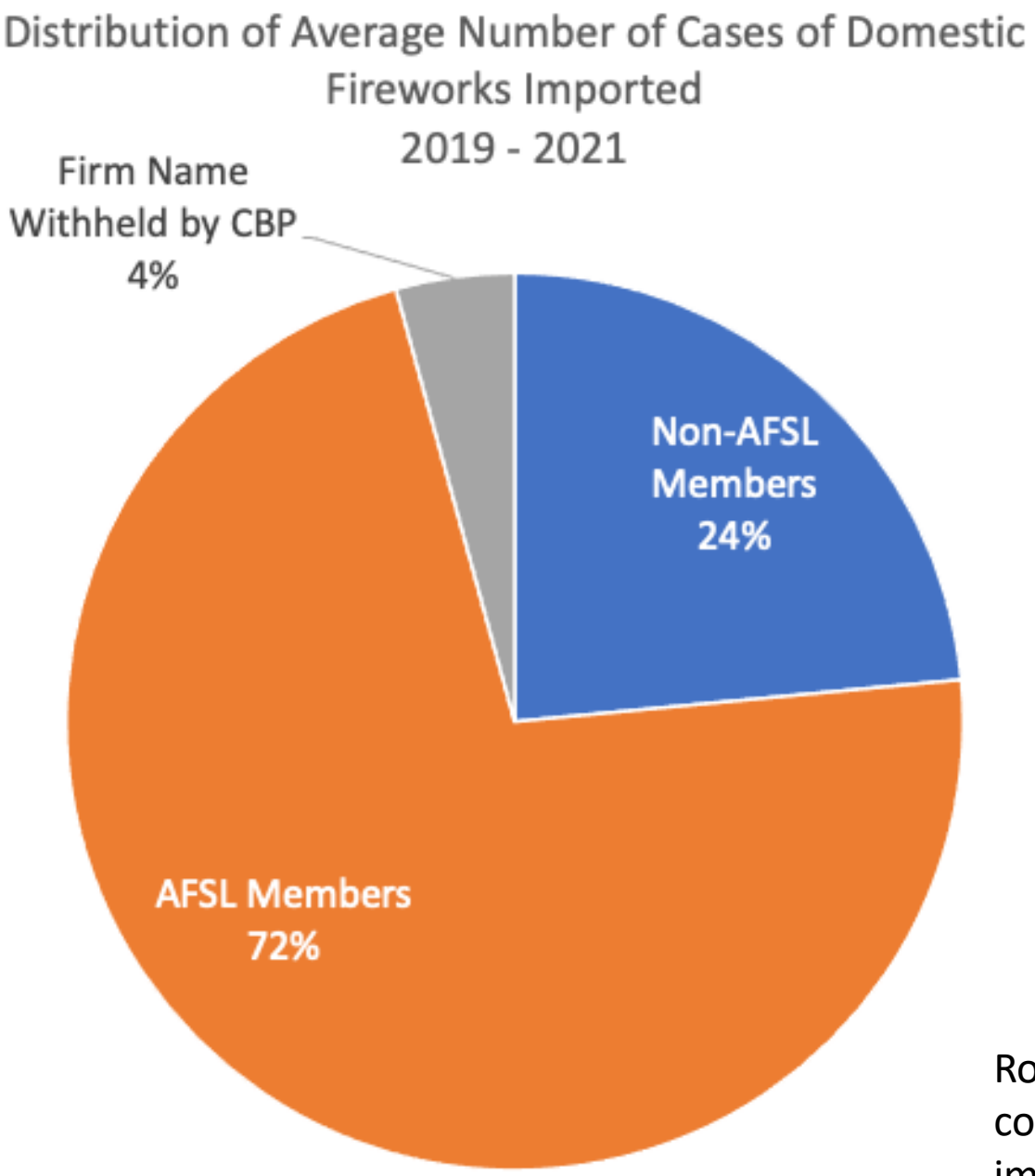
Key Observations

- Record-setting 2021 with 12.6 million cases tested by AFSL
- Year over year testing activity is up 5%, January through July, sitting at 7.6M with 5 months remaining in the year.
- AFSL staff anticipating a drop in volume through the end of 2023.



**source: APA U.S. Fireworks Consumption Figures 2000 - 2021

Consumer Fireworks Market Overview

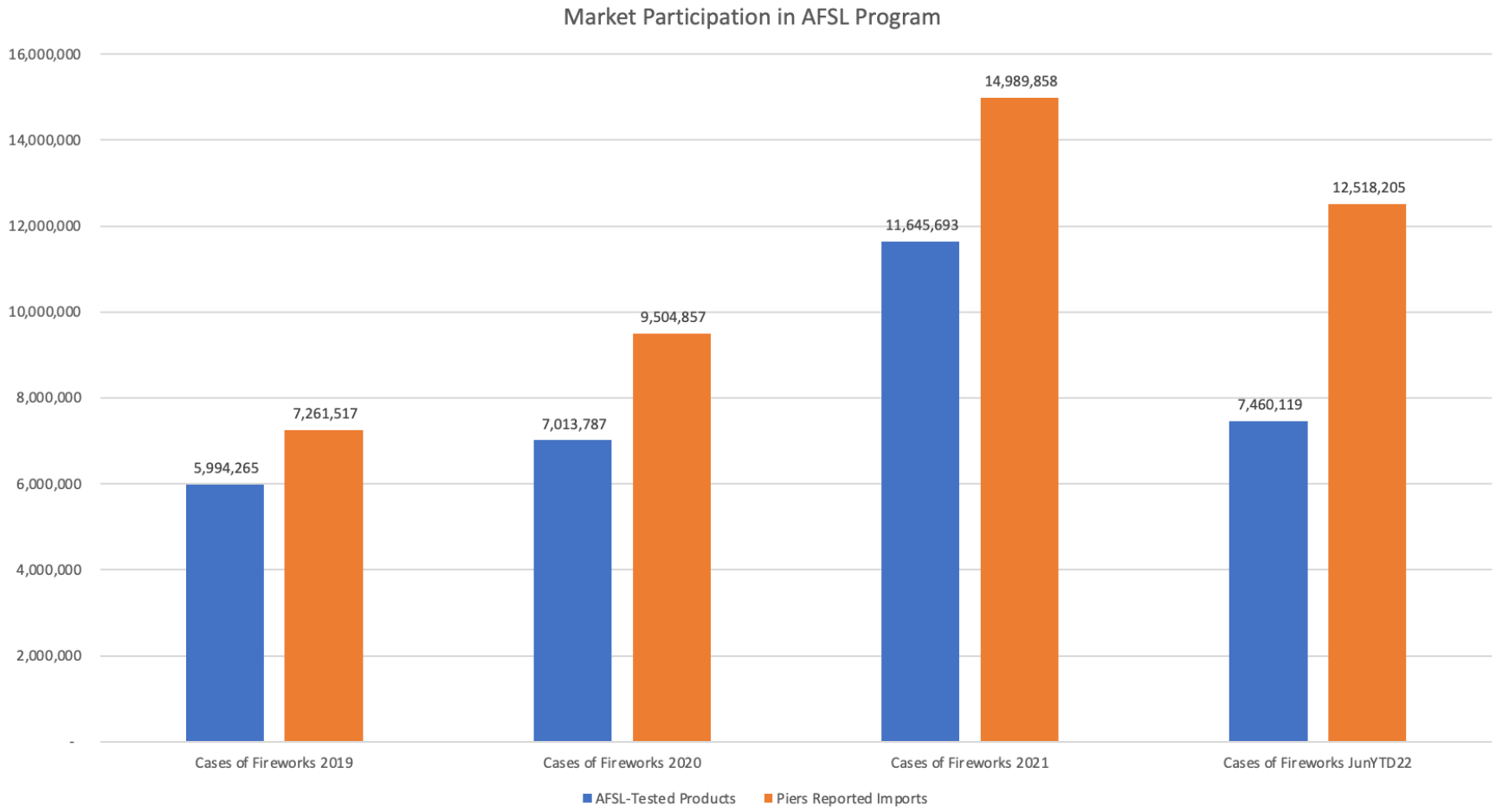


Roughly 15 million cases of consumer fireworks were imported into the US in 2021

Source:
Port Import/Export Reporting Service Reports January 2019 through December 2021

Key Observations

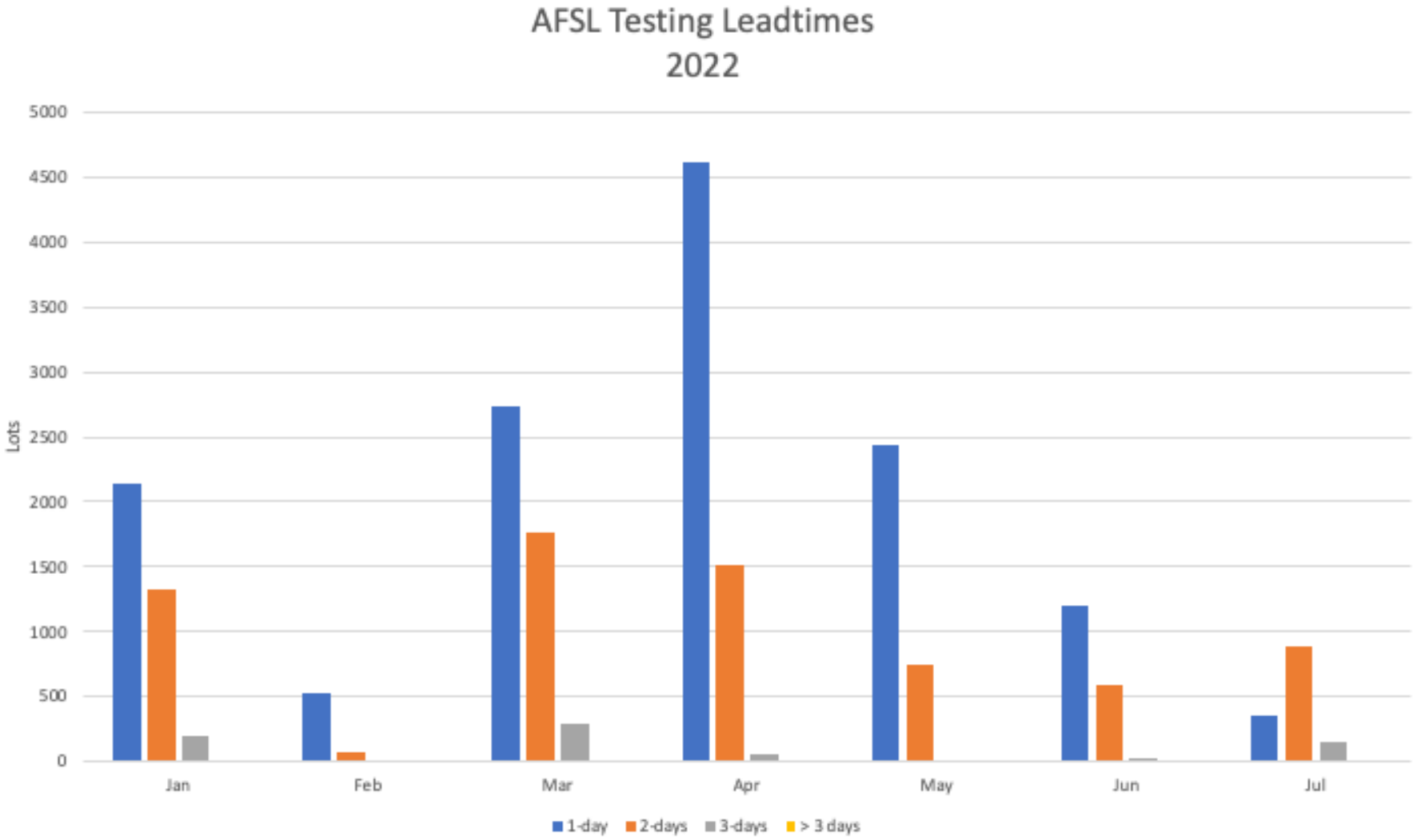
- June YTD 2022 AFSL-tested cases are running about 60% of Piers reported total volume of fireworks imported into the US.
  - In 2021, the percentage was about 78%.
  - The gap between AFSL volume and total imports has averaged about 2.4 million cases over the last three years.



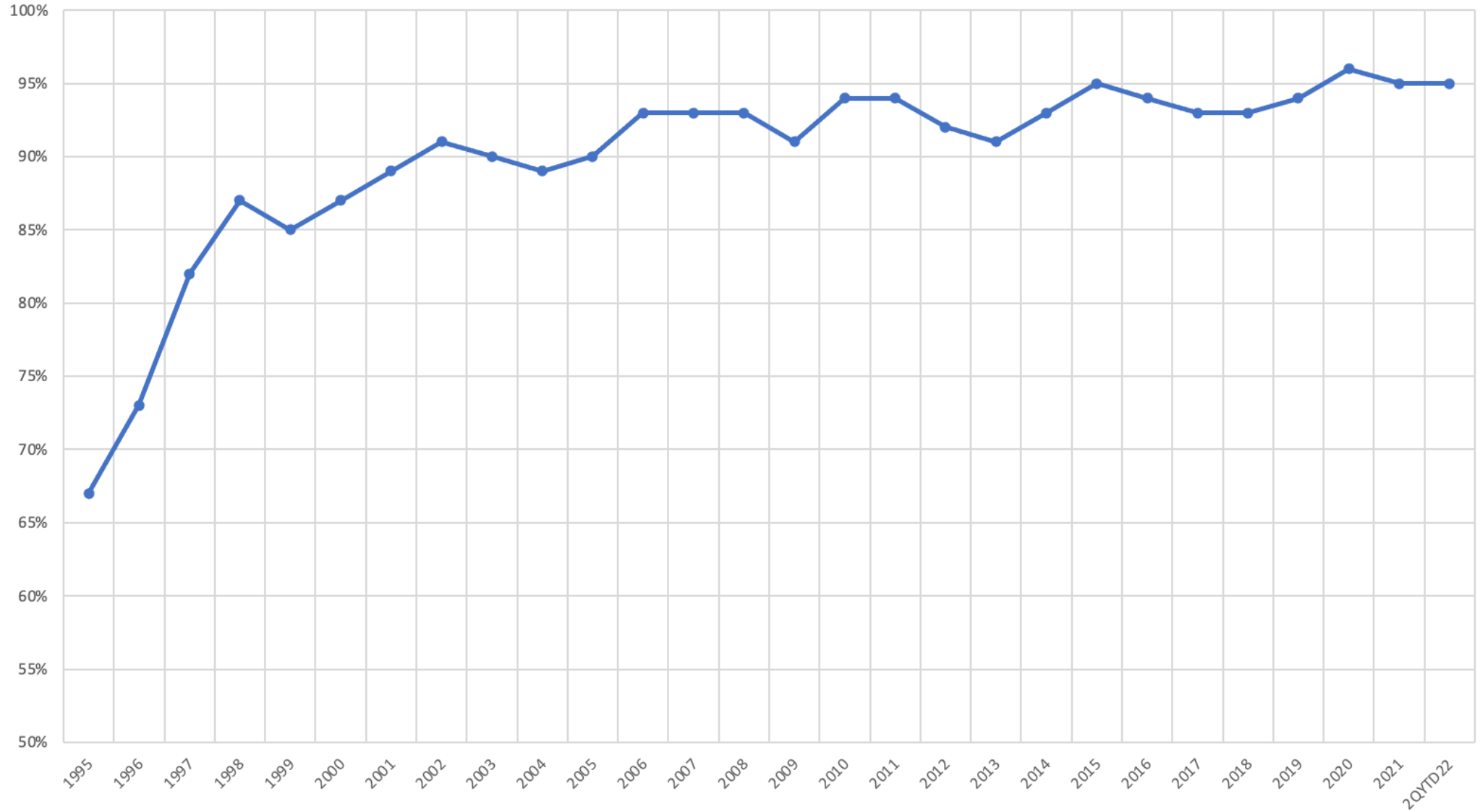
Source: Port Import/Export Reporting Service Reports January 2019 through December 2021

Key Observations

- Despite record testing volumes in 2021, we tested 97% within 2 days of the request and 99% within 3 days.
- While 2022 testing demand is currently running as high as 2021 levels, we are testing 97% within 2 days of the request and 100% within 3 days.
- Effective use of our resources allows us to meet service commitments to our members.

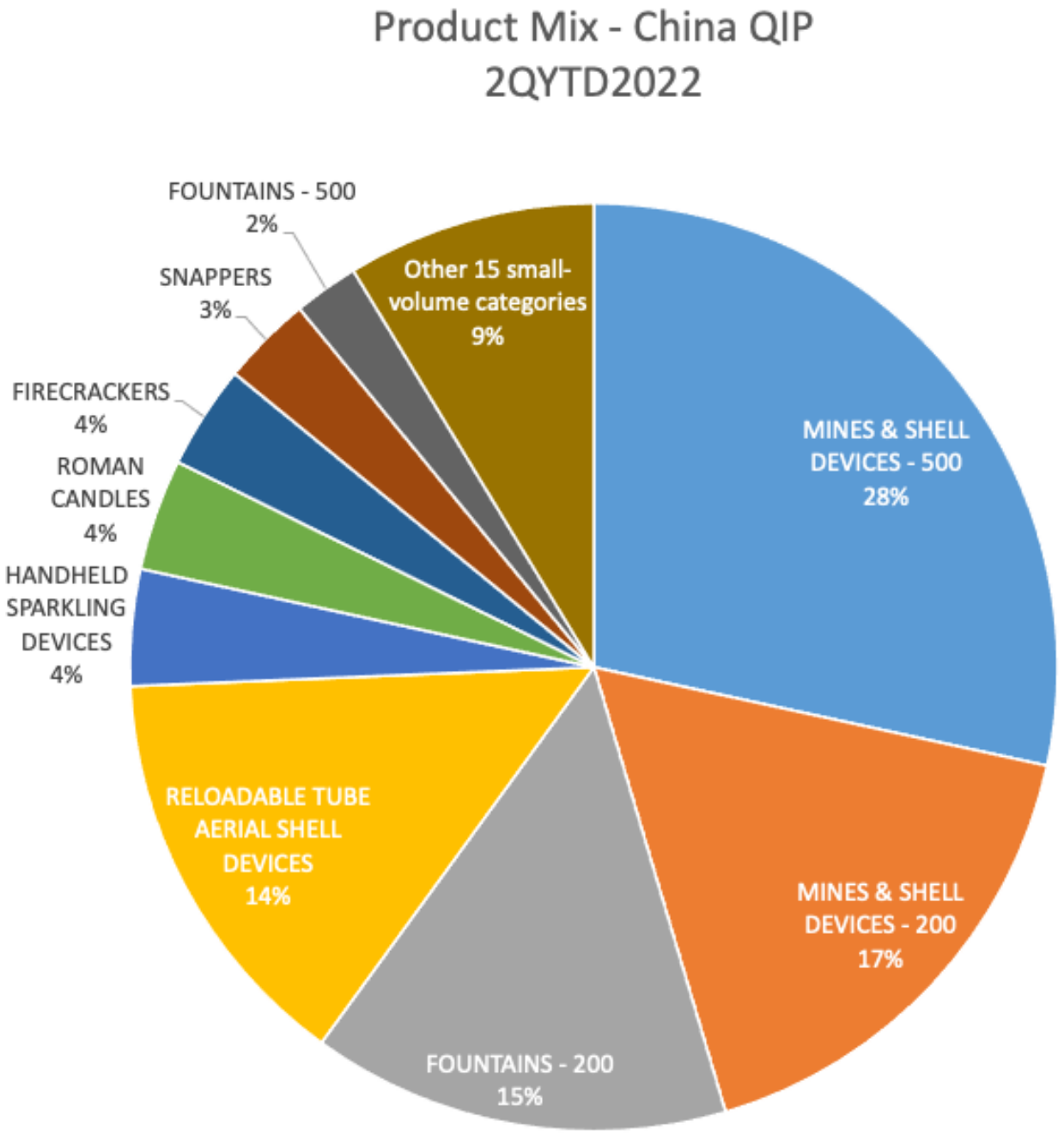


AFSL Compliance Rate



What Are We Testing?

- Almost half of the testing volume has been Mine & Shell Devices (45%)
- 200-gram Fountains (15%) and Reloadable Tube Aerial Shell Devices (14%) round out the roughly top 75% of the cases tested this year.



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China Report

William Zhou – China Operations Manager

Audit Summary
January – July 2022

- Conducted 79 factory audits, covering 335 lots
  - 37 deviations assigned to BV

Summary of Audit Findings
BV

- Falsified data or skipped test procedure
- Failed to detect a significant violation
- Weak safety measures used when dissecting and testing products
- Inadequate supervision of Lot I.D. stamping or sticker application

Annual Certification Training

2022 Annual Certification Training and Testing

August 24 - 27, 2022

We now have 11 senior certified technicians and 11 certified technicians

China Industry Update

- The industry has resumed production after the summer break.
  - Many are experiencing a significant drop in demand, so are moving slowly to ramp back up after the break.
- There will be another break in October, due to the 20th Communist Party Conference in Beijing.
  - The break will last roughly 15-20 days.
- Local factories and shippers have been inquiring about the Brazilian fireworks industry after hearing about review given at NFA expo.

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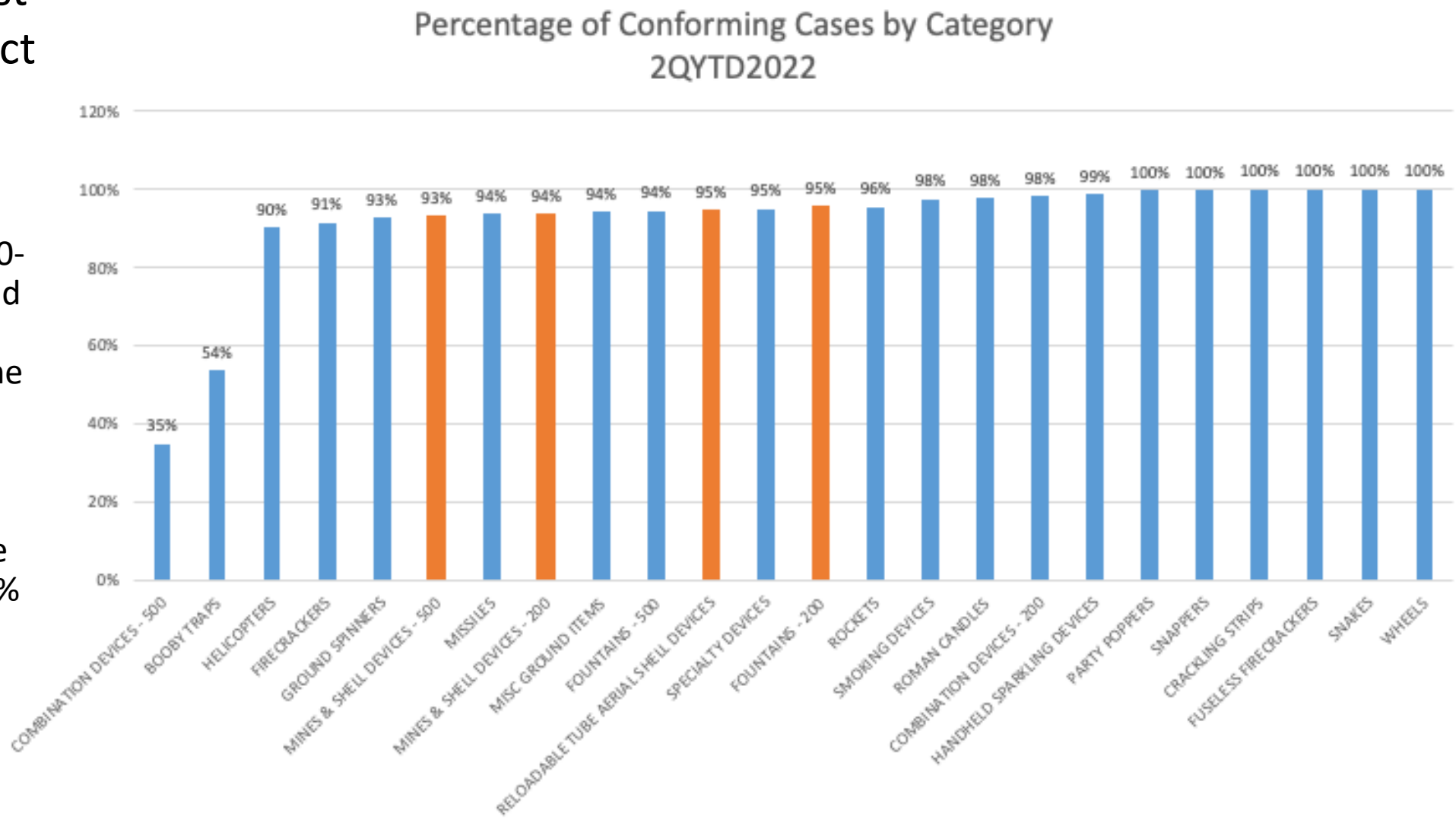
Current Failure Trends in Consumer Fireworks

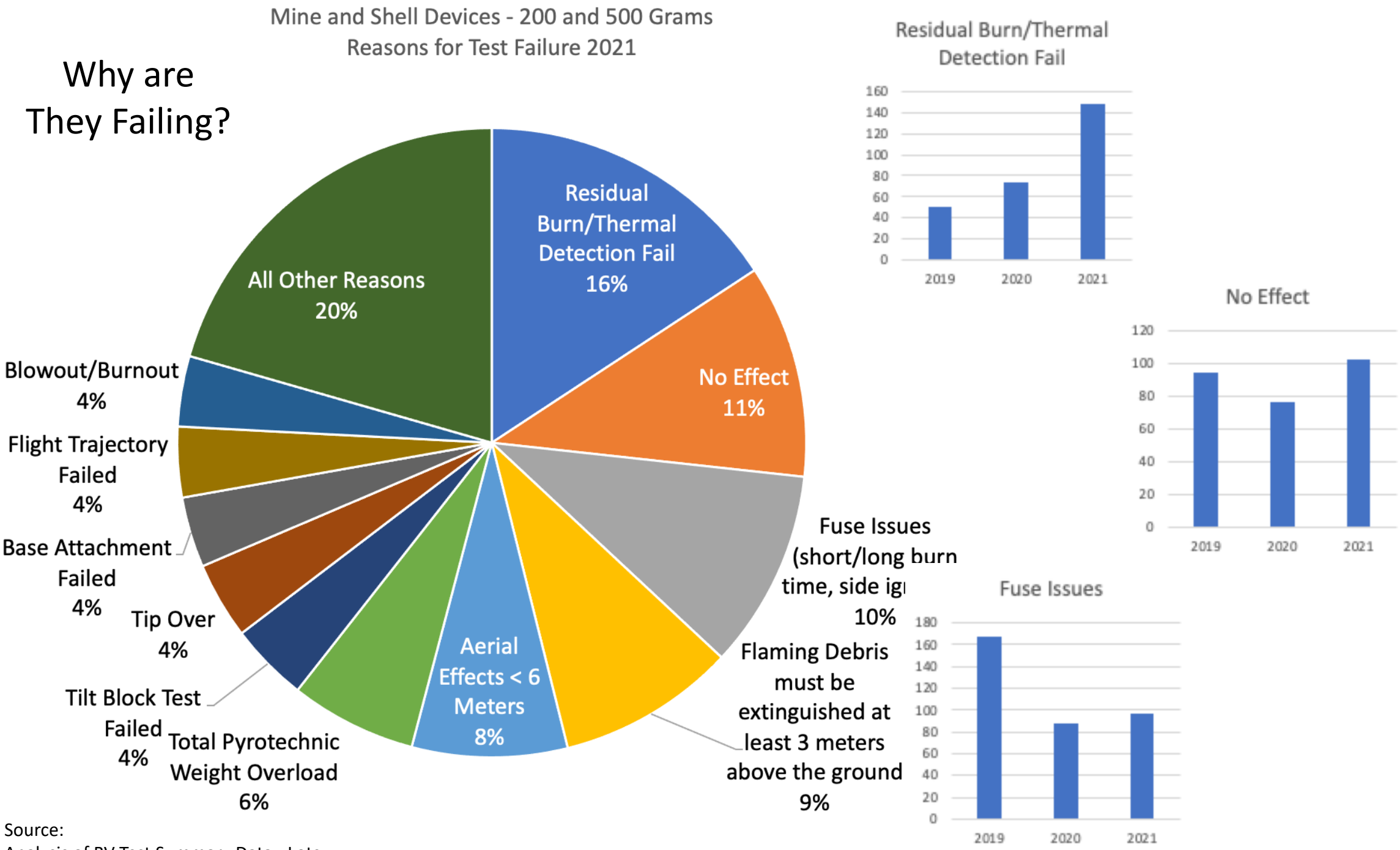
Chuck Rogers – BV Americas Director, Technical Consulting & Supply Chain Solutions

What are the Test Results by Product Category?

- 200 and 500 gram mine and shell, 200-gram fountains, and reloadable shells have dominated the 2022 testing schedule thus far.
- Test fail rate for these devices were 6%, 7%, 5%, and 5% respectively.

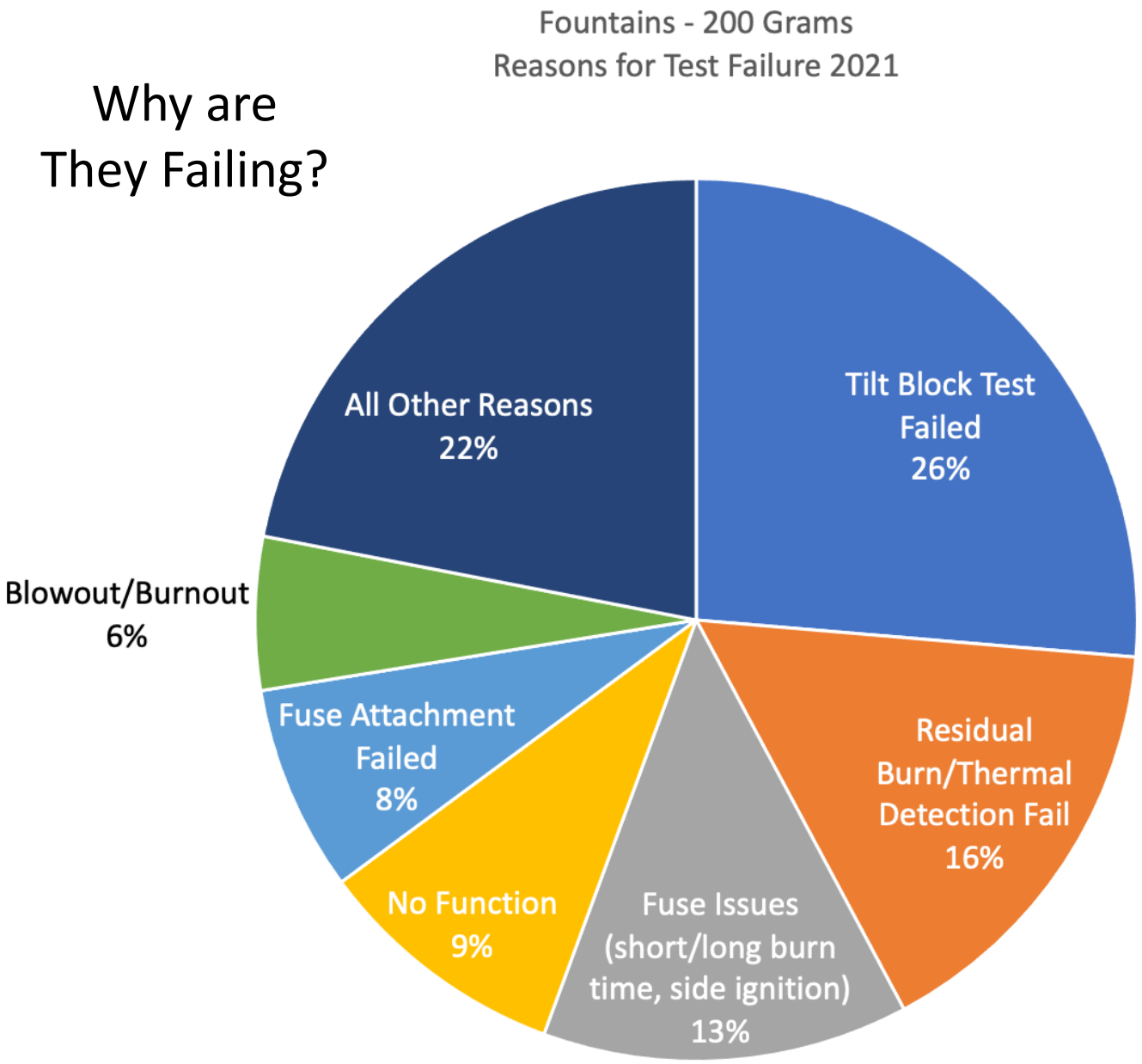


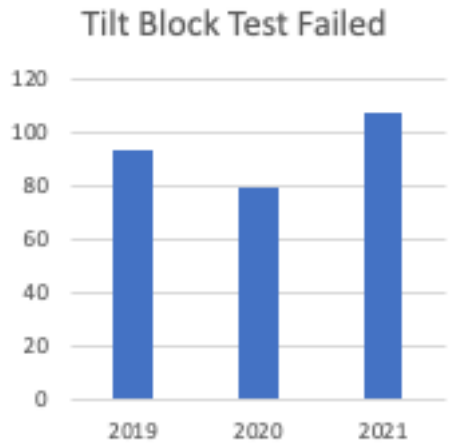
Why are They Failing?

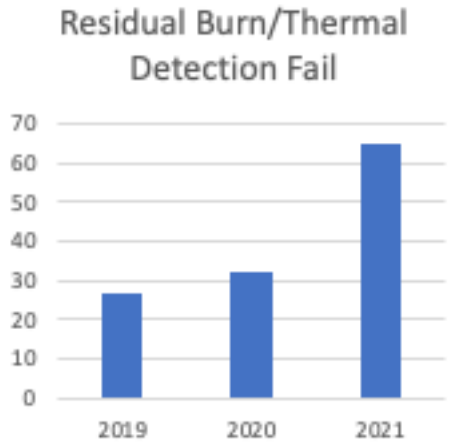


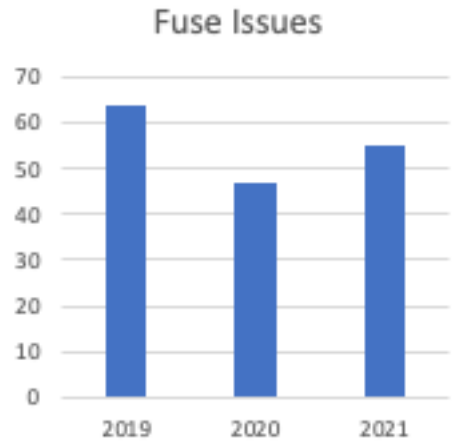
Source:
Analysis of BV Test Summary Data - Lots

Why are They Failing?









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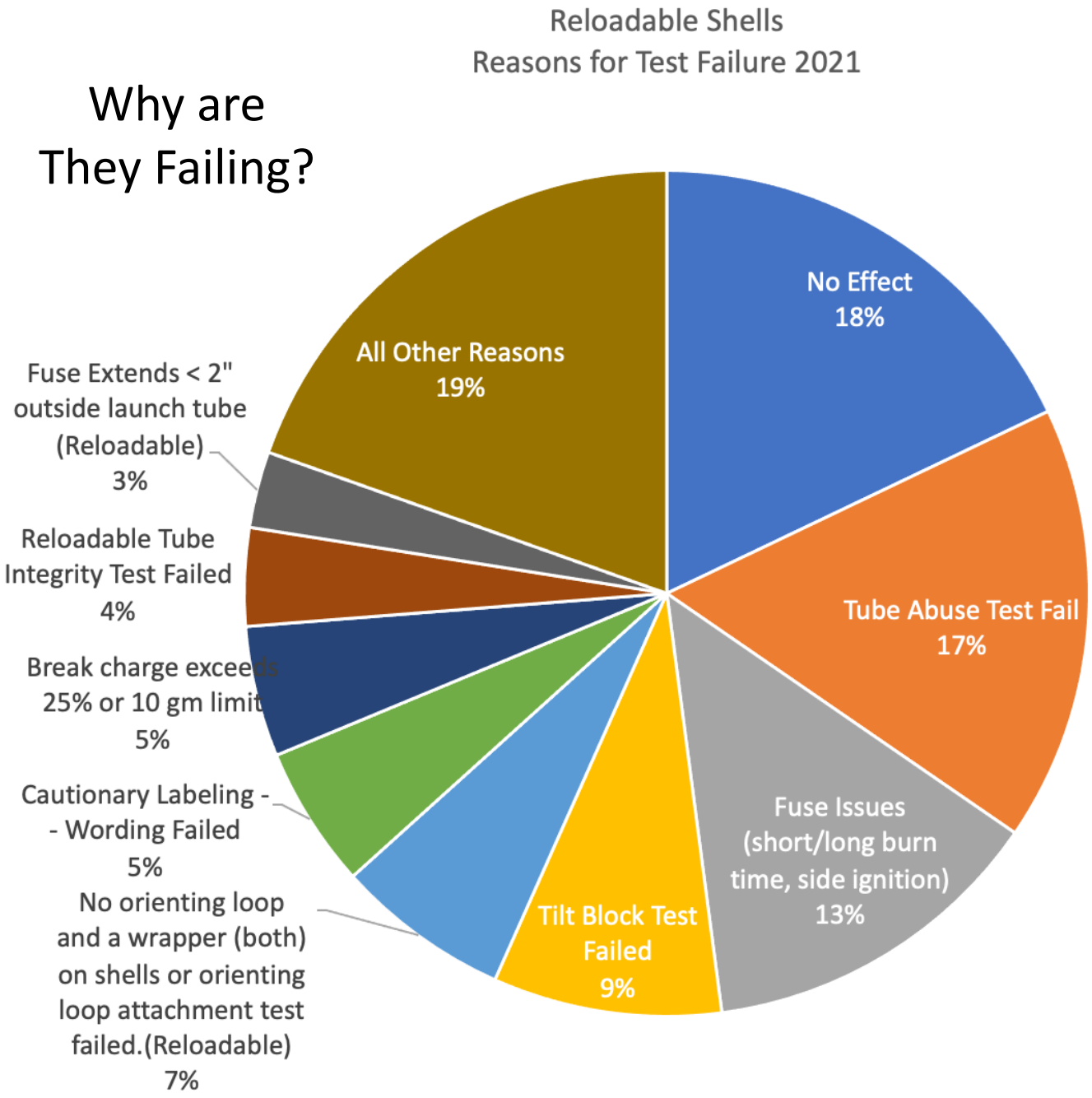
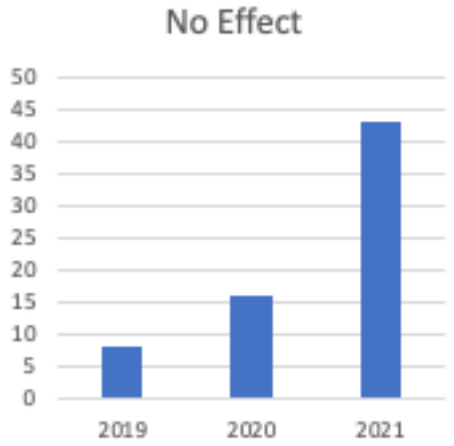
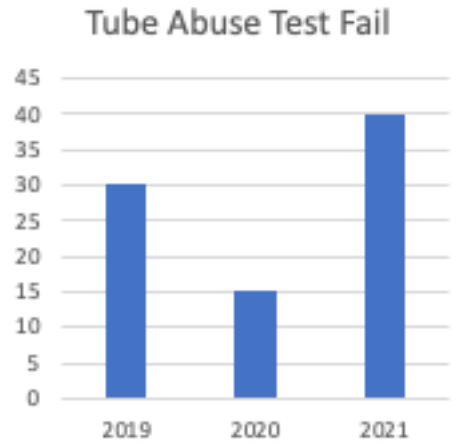
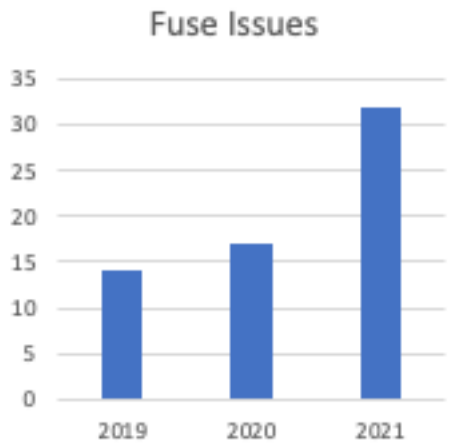
Why are They Failing?





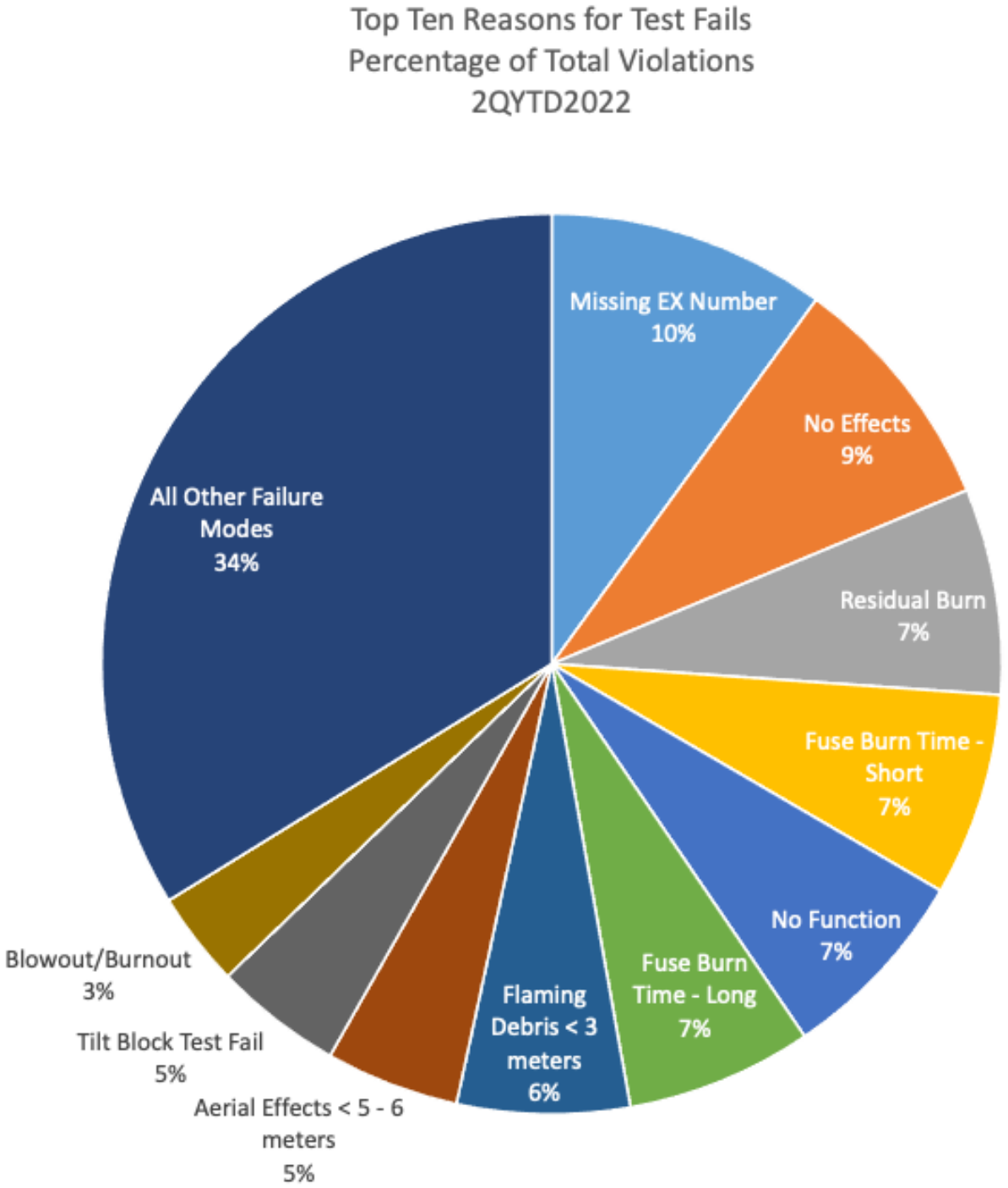




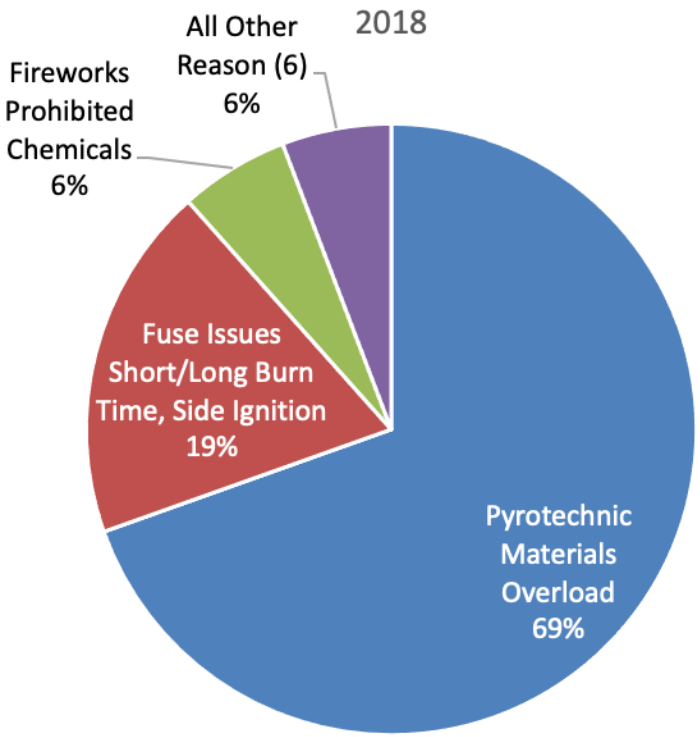
Source:
Analysis of BV Test Summary Data - Lots

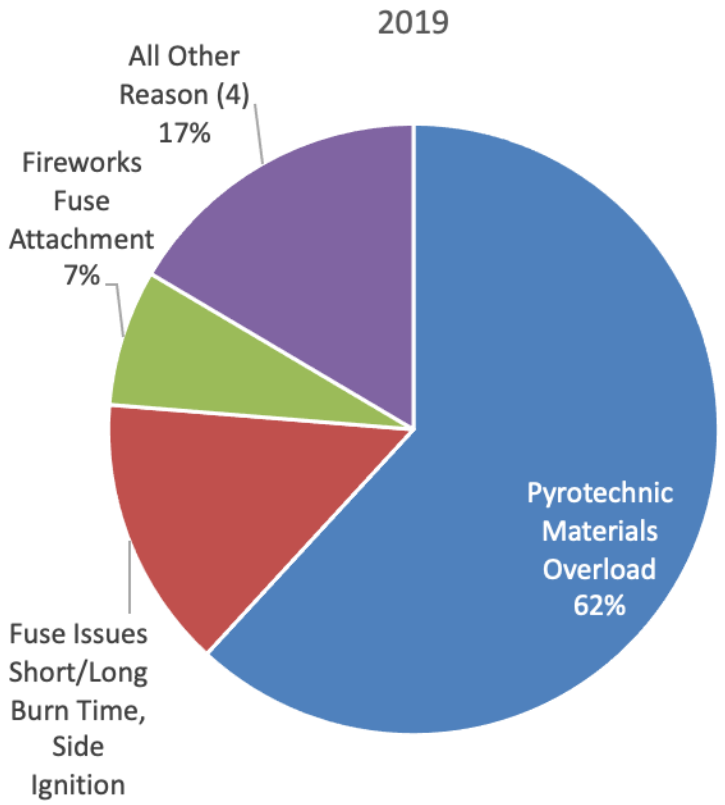
Why are They Failing?

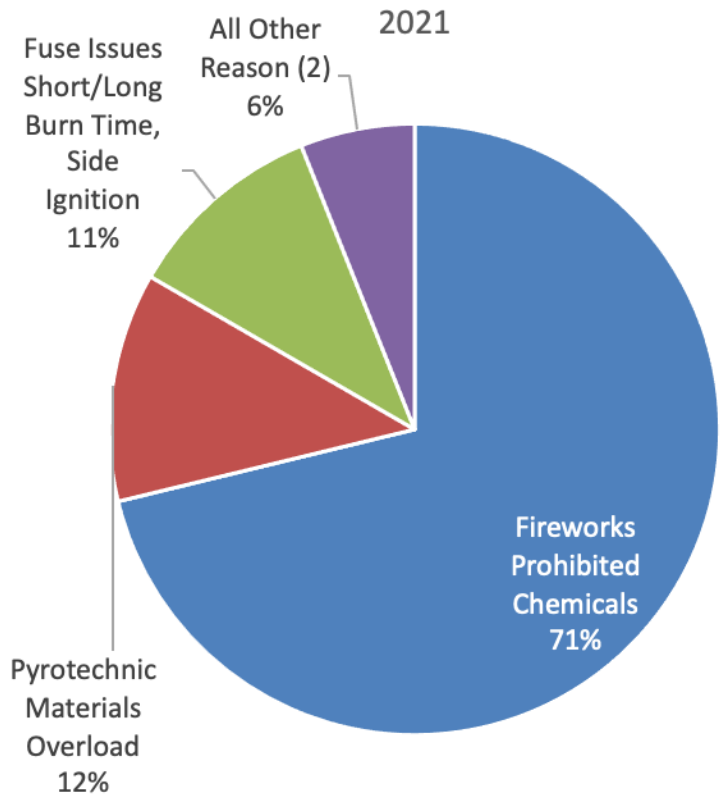
- A review of the top failure modes thus far in 2022 indicate fuse issues (long and short burn times) is responsible for about 14% of the total test fails.



CPSC Import Surveillance and Office of Compliance Findings
Fireworks-Related Notices of Violations







Source: U.S. CPSC Notices of Violation Database; www.cpsc.gov/recalls/violations

BREAK

THE MEETING WILL RESUME IN 15 MINUTES.

Jieli is collecting ballots

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AFSL Regulator Engagement and Training Activity

Regulator Engagement and Training

- Worked with APT-Research, Dr. Matthew Green, and Billy Magalassi with Oklahoma State University and PHMSA with research comparing pressures produced by fireworks.
- Worked with Jim Narva with NASFM, and now working with the new NASFM Director Butch Browning on adopting a uniform code for fireworks sales, storage, and safety
- Attended National Associations of State Fire Marshals Annual Symposium.
- Worked with the Virginia Fire Marshal's Office. Providing technical assistance with their annual fireworks testing and approvals.
- Working with several State Fire Marshal's Office, Local and State Officials, ATF, DOD EOD, and the FBI. Presenting technical training sessions.

Overpressure Research

National Association of State Fire Marshals

National Association of State Fire Marshals

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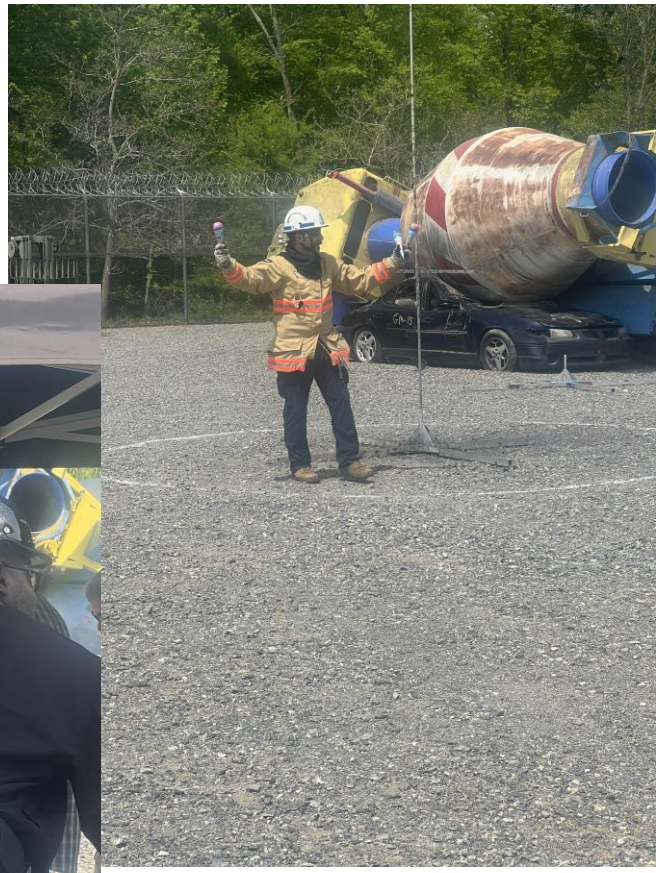
Virginia Annual Fireworks Testing



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AFSL Technical Training - General Topics

Federal Regulations
AFSL Standards and Testing Requirements
Consumer Fireworks Dissection and Analysis

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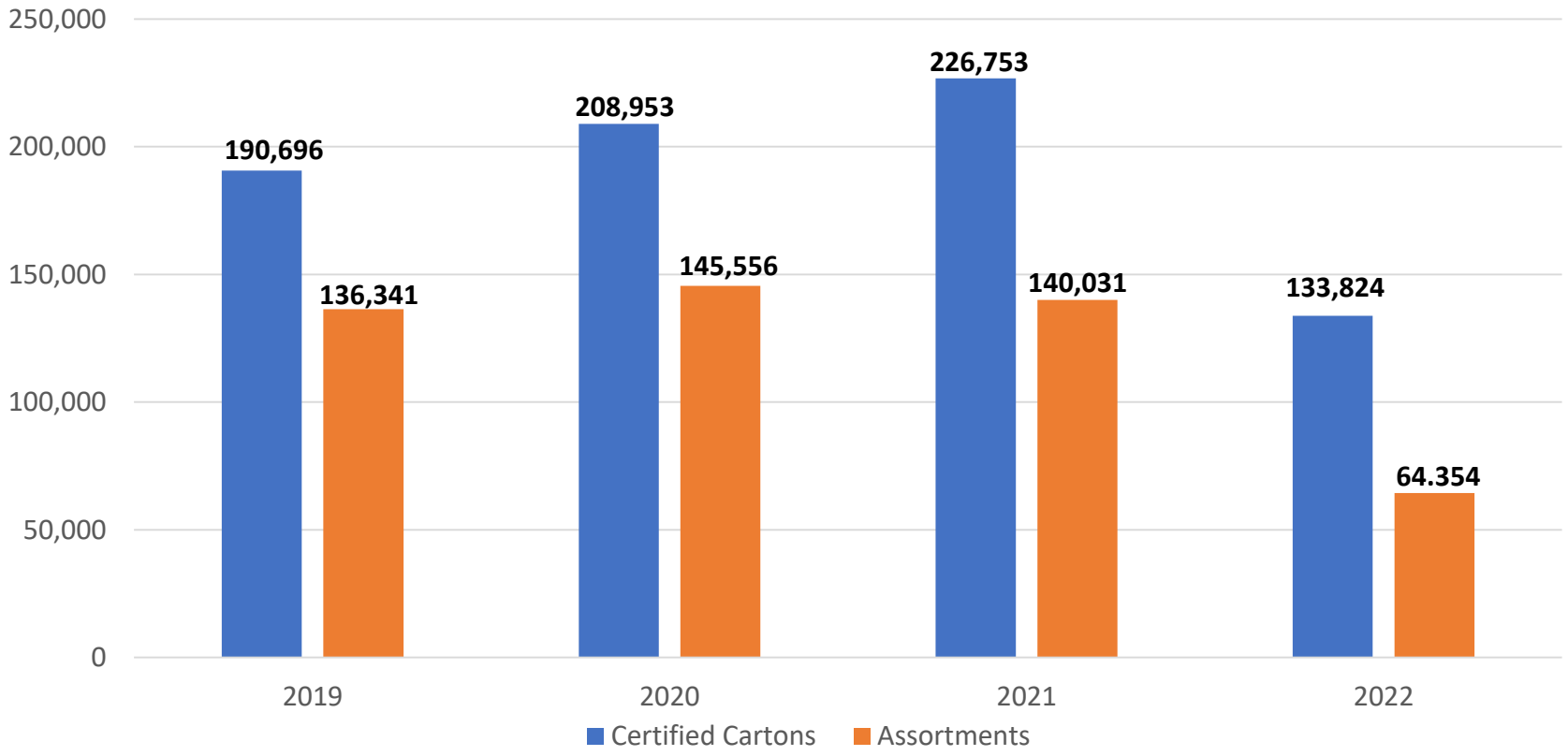
Cartons and Assortments Certified through AFSL's Domestic Testing Program

2019 – Jun 2022



AFSL Testing

AFSL LABORATORY TEST REPORT

CO NC AB CA NF

MINE & SHELLS DEVICES LOT ID #

SHIPPER
DATE OF TESTING
MODEL/ITEM #
PRODUCT NAME
DATE OF MANUFACTURING
MANUFACTURER ADDRESS

QUANTITY cases
PACKING
LOT SIZE
SAMPLE SIZE
FACTORY ID #
EX/FC # ON CTN
LABEL #'s to
to

TEST DETAILS

A. PYROTECHNIC LEAKAGE: P F
Amount ___ mg. ___ of ___ failed.

B. FUSE ATTACHMENT: P F
___ of ___ failed.

C. BASE/SPIKE STABILITY:
1. Height: ____cm; Base: ____cm; Ratio: ___: 1. P F
2. Securely attached: ___ of ___ failed. P F
3. 18° / 61°Tilt test: ___ of ___ failed. P F

D. PYROTECHNIC WEIGHT:
Total weight (g): ____, ____, ____, ____, ____
1. Multiple tube devices:
   a. 200 gm limit per device. P F
   b. 500 gm limit per device. P F
   - Tubes attachment/separated by 0.5" P F
   - Base made of wood / plastic material. P F
2. Single Tube Shells and Comet:
   a. 60 gm total chemical composition. P F
   b. 20 gm propellant limit per tube. P F
3. Multiple Tube Shell or Comet Devices:
   a. 52 gm total chemical composition per tube. P F
   b. 12 gm propellant limit per tube. P F
4. Single and Multiple Tube Mine Devices
   a. 40 gm pyrotechnic limit per tube. P F
5. Break charge(g): ____, ____, ____, ____, ____
   Break charge(%): ____, ____, ____, ____, ____
   a. For tube >1", must not exceed 25%/10gm. P F
   b. For tube ≤1", must not exceed 50%/10gm. P F
   c. Complying break charge P F
6. Break charge steel ball test result (m): P F

7. Average report weights in mine / shell: ___mg P F

E. FUSE:
1. Side ignition: ___ of ___ failed. P F
2. Safety fuse required. P F
3. Fuse location. P F

F. FUSE BURN TIME/0.1 sec:

___ devices exhibited Short Fuse BT. P F
___ devices exhibited Long Fuse BT. P F
___ devices did not function. P F

G. BURNOUT/BLOWOUT:
___blowout and ___burnout of ___ tested. P F

H. NO HARD DISCS INSIDE SHELL: P F

I. TUBES FIRE SEQUENTIALLY: P F

J. EJECT IN A NEAR-VERTICAL PATH P F

K. FUNCTION OF EFFECTS:
1. AEFM: ____ of ____ failed. P F
2. NOEF: ____ of ____ failed. P F
3. Flaming debris ≥ 3 m: ____ of ____ failed. P F
4. Time between effects ≤ 10sec:
   ____ of ____ failed. P F
5. Must not tip over on ground or 2" foam:
   ___ of ___ failed. P F

L. PERFORMANCE/FUNCTIONING REQUIREMENT:
1. Flight trajectory ≤22.5° from vertical:
   ___ of ___ failed. P F
2. Radius of effects <4m: ___ of ___ failed. P F

M. ITEM CONSTRUCTION:
1. Not continue to burn or re-ignite after function. P F
2. Thermal detector after 0.5 hour(250° F /121° C) P F

N. CAUTIONARY LABELING:
1. Wording. P F
2. Type Size. P F
3. Placement. P F

O. PRODUCT IDENTIFICATION
Common or usual name. P F

P. SHIPPING CARTON LABELING:
1. Orange 1.4, G Label. P F
2. Fireworks "UN0336" Label. P F
3. "UN" Box Certification Mark. P F

REMARKS:

TECHNICIAN DATE

CERTIFIED TECHNICIAN DATE

REVIEWED BY DATE

Domestic Injury Surveillance and AFSL Standards Activity

- Jerry Wingard – Director of Standards and Compliance
  - 2022 Fireworks-Related Incidents Investigations

AFSL 2022 Fireworks Investigations

- In 2022, AFSL investigated 16 fatalities and 40 injuries and fires reportedly related to fireworks
  - Traveled to several locations and have several still pending waiting on decisions to prosecute
  - Several agencies have provided limited information such as redacted reports
- Following is a summary of the sixteen fatalities and forty injuries and fires that were investigated

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2022 Fireworks Related Fatalities

- 16 reported fatalities
  - 7 – Consumer fireworks
  - 5 – Homemade and illegal fireworks
  - 2 – Involved display shells
  - 2 -- Unknown
- Reported Cause of Death
  - Blunt force trauma to head, hands, chest, abdomen, heart, lungs

- Consumer Fireworks-Related Fatalities
  - All seven consumer fireworks fatalities are reloadable tube aerial shells.
    - Two reloadable tube aerial canister shells.
    - One reloadable tube aerial ball shell.
    - Four are unknown
- One of the devices had been tested by AFSL several years ago but the member had not tested any items in several years
  - Taken off member list
- Two had been tested by AFSL Program
- Others are currently unknown

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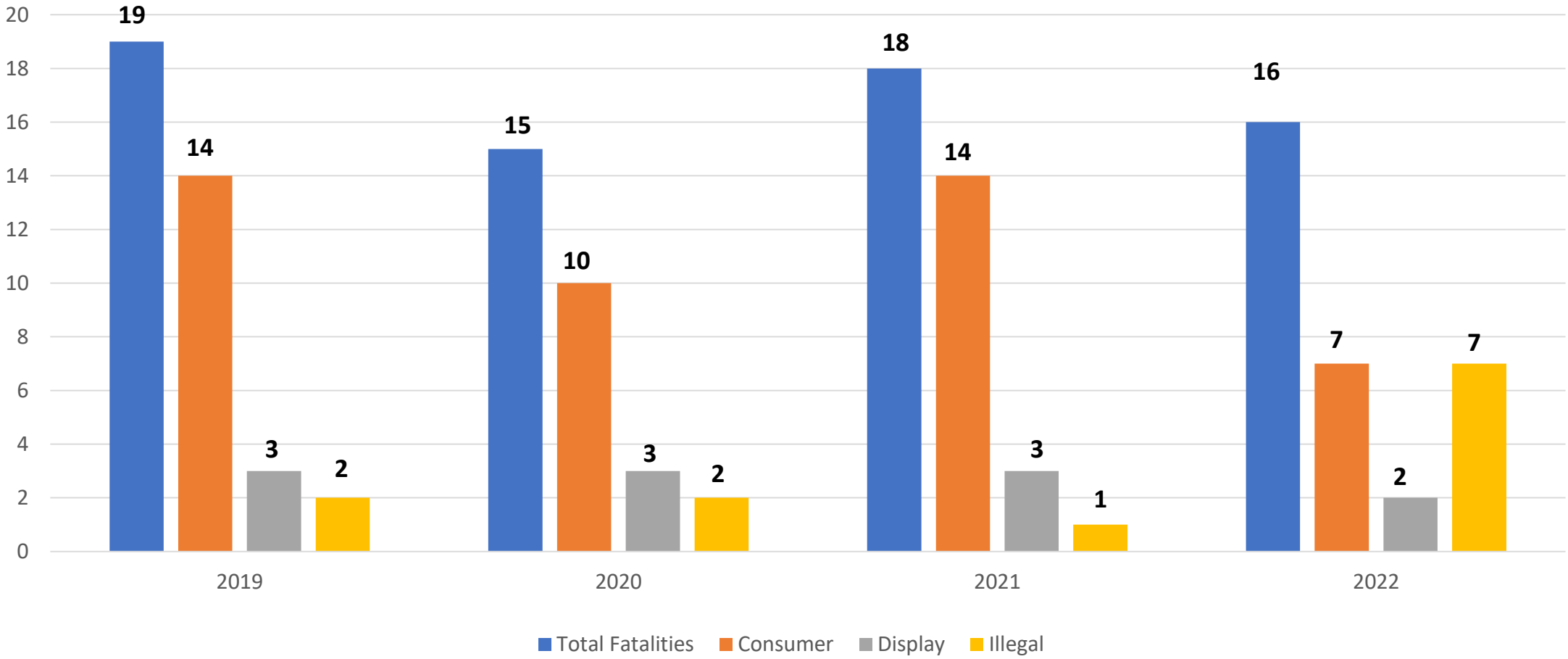
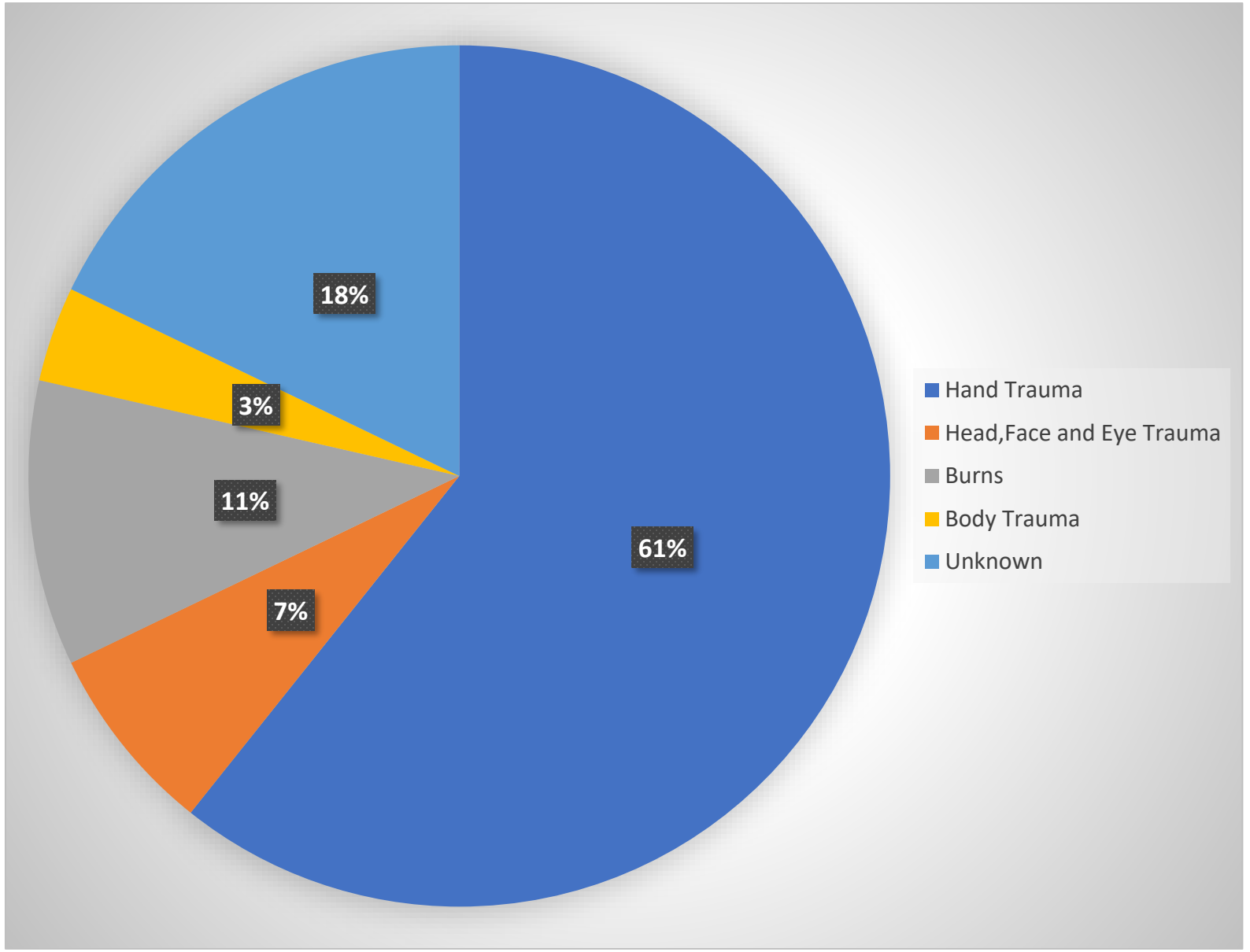
Fireworks Fatalities

2019 – YTD2022



28 Fireworks-Related Injuries Investigated

- 17 – Severe trauma to hands; loss of hands and/or fingers
- 2 – Trauma to head, face, and eyes
- 3 – Fires and burns.
- 1 – Trauma to abdomen and legs
- 5 – unknown or unidentified



Count of CPSC_Case_Number	Column Labels						
Row Labels	2016	2017	2018	2019	2020	2021	Grand Total
82 - Hand	**50**	**70**	**52**	**59**	**108**	**62**	**401**
47 - Burns, Not Specified					1		1
49 - Burns, Chemical			2	1			3
51 - Burns, Thermal	36	56	36	43	60	36	267
53 - Contusions, Abrasions	1	1		1	4		7
56 - Foreign Body		1			1		2
57 - Fracture	3		6	2	11	4	26
59 - Laceration	3	4	4	3	12	7	33
64 - Strain, Sprain					1		1
71 - Other/Not Stated	3	7	2	5	8	11	36
72 - Avulsion				1	4	2	7
50 - Amputation	4	1	2	3	6	2	18
92 - Finger	**40**	**49**	**40**	**43**	**47**	**34**	**253**
48 - Burns, Scald					1		1
51 - Burns, Thermal	26	23	14	14	17	17	111
57 - Fracture	5	2	5	4	8	5	29
59 - Laceration	2	3	4	3	5	2	19
64 - Strain, Sprain				1			1
71 - Other/Not Stated	1	1	2	3	1	2	10
72 - Avulsion		2		1			3
50 - Amputation	6	18	15	17	15	8	79
Grand Total	**90**	**119**	**92**	**102**	**155**	**96**	**654**

NEISS number of reported incidents from NEISS network hospitals

Row Labels	2016	2017	2018	2019	2020	2021	Grand Total
0 - Internal				1			1
30 - Shoulder	3	4	1	3	6	6	23
31 - Upper Trunk	22	16	9	6	14	12	79
33 - Lower Arm	7	6	1	4	23	10	51
34 - Wrist	2	1	2	5	11	5	26
35 - Knee	3	2		3	6	3	17
36 - Lower Leg	12	15	14	16	19	14	90
37 - Ankle	3	5	4	2	5	6	25
38 - Pubic Region		3	1	2	1	1	8
75 - Head	10	13	6	12	15	17	73
76 - Face	30	37	23	24	46	47	207
77 - Eyeball	34	44	38	37	72	58	283
79 - Lower Trunk	8	6	5	11	13	7	50
80 - Upper Arm	2	7	4	3	7	4	27
81 - Upper Leg	8	9	6	11	10	10	54
82 - Hand	50	70	52	59	108	62	401
83 - Foot	8	10	10	7	6	11	52
84 - 25-50% of Body		1					1
85 - All Parts Body	7	9	4	1	8	12	41
87 - Not Stated/Unk			1	1		2	4
88 - Mouth	3	3	3	1	5	5	20
89 - Neck	4	1	2	3	4	4	18
92 - Finger	40	49	40	43	47	34	253
93 - Toe	1	5	4		2	1	13
94 - Ear	11	13	4	6	12	7	53
32 - Elbow						1	1
Grand Total	**268**	**329**	**234**	**261**	**440**	**339**	**1871**

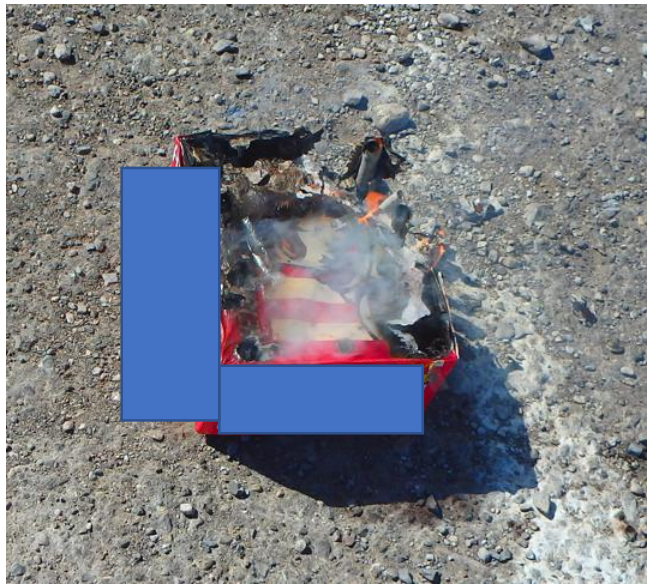
Hand Injuries

The Hand Injury Task Group is still investigating the possible cause of fireworks-related hand injuries and developing possible approaches to mitigate the risk of these types of injuries

- The Task Group has begun generating some ideas and moving forward to help mitigate the risk and reviewed these proposals with the Standards Committee
- These ideas were presented at the last Standards Committee meeting and will be revisited at the upcoming meeting

Observation

- AFSL has historically adopted new tests, such as the upside-down test, to help mitigate the risk of fireworks-related injuries
  - There may be a need to conduct an evaluation of recoil forces and their potential impact on tube and base integrity when the base is not placed on a hard flat-level surface. Plan on this being discussed at the next Standards Committee meeting
- Residual burn continues to be an issue
  - We continue to see an increase in residual burn failures at state-level testing and other testing and observation by AFSL Staff
  - We intend to review our residual burn / thermal fail requirements and testing procedures to better identify products subject to these types of failures
  - We are also testing the moisture content of items in China and then retesting when they arrive in the US



AFSL Standards Development

Upcoming Standards Committee Meeting

- Continue to address the increase in reported residual burn incidents
  - Test items for residual in Fountains, Mine and Shells, and Novelties.
- Review and discuss current packing standard for snappers
- AFSL Standards – Revise the format to make it easier to use
- Continue the review of fireworks-related hand injuries and explore ways to help mitigate the risk of these types of injuries

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Emerging Producer Market Review

Brazil

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Brazil Fireworks Industry Evaluation - Santo Antonio do Monte, Minas Gravis, Brazil

Toured laboratory and eight factories
Attended four device demonstrations

Observations

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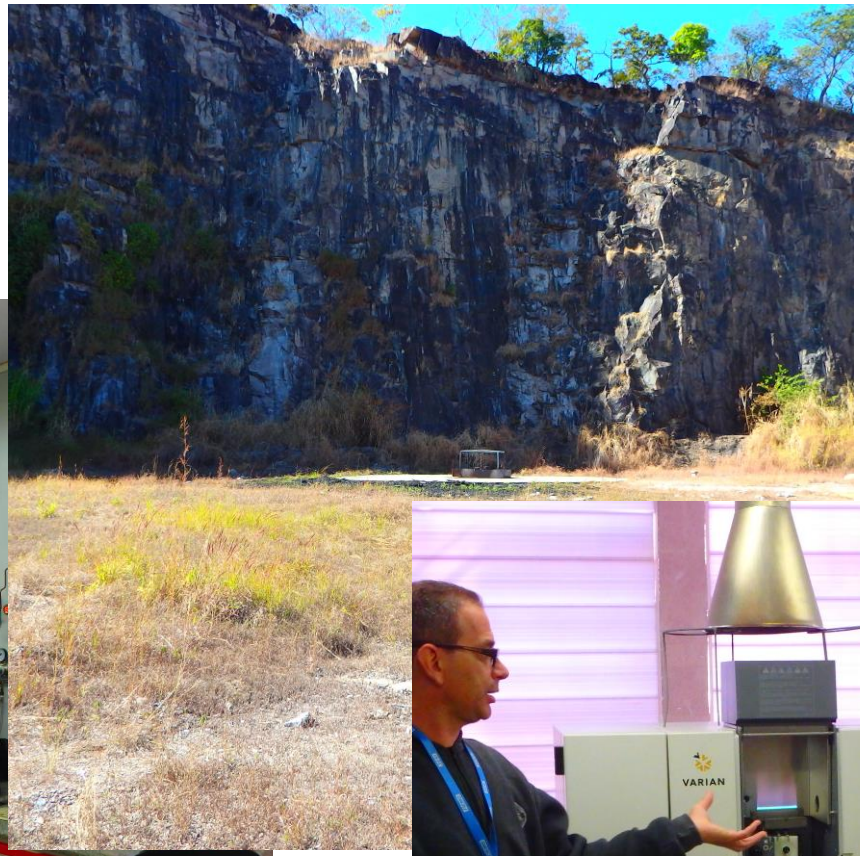
SENAI Laboratory

Pyrotechnic Materials Experts
Accredited by INMETRO
Recognized by Brazil's Army



AFSL American Fireworks Standards Laboratory

Election Results

Jay Howell – Executive Director

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Closing Remarks

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