



**1791 Tullie Circle, N.E. / Atlanta, GA 30329  
404-636-8400**

**TC/TG/TRG MEETING MINUTES - draft**

TC/TG/TRG NO. (TITLE): TC 5.9 Enclosed Vehicular Facilities  
DATE/TIME OF MEETINGS: June 29, 2021 2 PM- 4:30 PM EDT  
LOCATION: Microsoft Teams online meeting

1. The Chair, David Newman, called the meeting to order at 2:05 pm.
2. Identification of Voting Members. There were 8 of 9 voting members present, which met requirements for a quorum.
  - David Newman – Chair
  - David Hahm – Research S/C Chair
  - Dimitry Kogan
  - Bill Lampkin
  - Matt Davy – Vice Chair
  - Yoon Ko – Programs S/C Chair
  - Andrew Louie – Handbook S/C Chair
  - Duncan Phyfe
  - James McCarron – not present
  - Note Matt Davy replaces Tom O'Dwyer, since our last meeting Tom and David Newman are now working for the same company. ASHRAE policy allows one voting member per company.
3. Approval of Minutes at last meeting – January 26, 2021 Virtual meeting.
  - Duncan Phyfe motion with correction, second by Dimitry Kogan
4. Chairman's Remarks – David Newman
  - The monthly Teams meetings have allowed more frequent gatherings. While meeting in person at the Winter and Annual conferences is great for meeting in person, the virtual Teams meeting does allow more frequent meetings and more people to join in. The monthly meetings also provide time for subcommittee work between the main meetings – making more progress throughout the year. Upcoming monthly meeting focus:
    - July 27 Programs Deadline is August 2 for seminar, forum for Las Vegas – January 2022
    - August 24 Handbook or Research
    - Will also meet September – October – November; will take a break in December
5. Kevin Marple, Section Head remarks
  - Virtual meetings are encouraged to keep the work/discussions moving throughout the year. Our TC 5.9 monthly meeting are a great example.
  - Suggestion to add more content to our website – Handbook and Research information would be good start.
  - ASHRAE will be providing more information on Basecamp soon.
  - Clarification on the Website vs Basecamp. The Website is a public site for information available to anyone. Basecamp suggested for internal communication, as for S/C work – handbook, research, etc.
6. Subcommittee Reports
  - Programs Subcommittee (Yoon Ko) – Ful Programs S/C report attached below
    - Deadline for Las Vegas (January 2022) is August 2 for seminar or forum proposal

- Standards Subcommittee (Yuan Li)  
SPC 217 met June 24 from 9 am – 2 pm. Work has continued since on the new standard since it was first released in July 2020. There are (7) subcommittees working on revisions and new material for the planned 1<sup>st</sup> Edition of the standard later this year. Igor Maevski is the SPC 217 Chair. List of subcommittees topics and chair listed below.
 

○ Station Thermal Comfort	Tom O'Dwyer
○ Virus and Bacteria Protection of Stations	Andrew Louie
○ High Speed Rail Aerodynamics and Ventilation	Yuan Li
○ Freight Tunnels Ventilation	David Newman
○ Alternative Fuel Vehicle Emissions/Ventilation	Norris Harvey
○ Hyperloop/other type of tunnels	Sean Cassady
○ Asset Management	Jane Miller
- Handbook Subcommittee (Andrew Louie)  
Work will continue on the next revision during monthly meetings. If you have any comments or suggestions, please send to Andrew Louie. Material is also planned to support SPC 217 standard.
- Research Subcommittee (David Hahm) – Complete List of Research Topics are attached
  - Stephen Bartha from FHWA discussed upcoming July meeting on EVS-FFFS project
  - Also, discussion on FHWA further developing Tunnel inspection criteria, like the existing Bridge inspection including TOMIE (Travel – Operations – Maintenance – Inspection – Evaluation), SNTI (Specifications for National Tunnel Inventory)
- Webmaster (Simona Tsvetkova)
  - - Simona will work with the S/C Chairs to add more content to the Website

#### 7. Liaison Reports

- NFPA 130 (Andrew Louie) – 2<sup>nd</sup> draft meeting scheduled for September
- NFPA 502 (Igor Maevski) – 2<sup>nd</sup> draft meeting scheduled for mid-October

#### 8. New Business and Comments

- Our new Secretary for TC 5.9 will be Simona Tsvetkova. Thanks Simona for agreeing to take on this role!

#### 9. Next meeting scheduled for Las Vegas, NV January 29-February 2, 2022. Meeting planned to be a hybrid with both in-person and virtual portions.

#### 10. Meeting Adjournment at 4:36 pm.

#### 11. Submitted by Jane Miller, Secretary – TC 5.9

#### Attachments:

- Program S/C report
- Research Topics
- Attendance

# TC5.9 PROGRAM SUB-COMMITTEE REPORT

## Virtual Meeting – Summer 2021

### 1. Programs for the current Virtual Meeting Programs:

- Forum 2 Post Pandemic Resiliency Measures for Transportation Facilities Track: Future Proofing Renewable, Regenerative, and Resilient, Sponsor: 5.9 Enclosed Vehicular Facilities  
Chair: Jesse Harder, P.E., Member, Jun 27 04:00 PM – 05:00 PM EST Zoom  
(about 20 attendees)

### 2. Future conferences

	Conference paper abstract due	Seminar, Forum proposal due
Las Vegas NV, Jan 2022		Monday, August 2, 2021
Toronto, ON, Jun 2022		
Atlanta, Georgia, Feb. 2023		
Tampa Bay, Jun 2023		

Debate

1 moderator, 60-90 min, 3-4 panelist, in individual presentations

Forum

1 moderator, 60 minutes, no presentations

Panel

1 moderator, 60-90 minutes, 3-6 participants, no individual presentations

Seminar

2-3 speakers for 60 min or 3-5 speakers for 90 min

Workshop

One chair and two presenters (maximum), 60 min long including 30 min presentation and 30 min discussion

- **Las Vegas NW, Winter Meeting Jan 29-Feb2**

The 2022 ASHRAE Winter Conference will be a hybrid experience, offering both in-person and virtual options for participation for attendees. The in-person conference will be held in Las Vegas, Nevada at Caesars Palace.

Track	Description	Track Chair
1	HVAC&R Systems and Equipment:	Anoop Peediyakkan peediyakkan@gmail.com
2	Fundamentals and Applications.	Bob Cox bob.cox@jacobs.com
3	Refrigerants and Refrigeration.	Billy Austin baustin@shultzeg.com
4	Buildings at 360°	Nohad Boudani nohadb@inco.com.lb
5	Energy System Integration.	Scott Peach sp@sp.engineering
6	Environmental Health and IEQ in the International Arena.	Som Shrestha shresthass@ornl.gov
7	HVAC for Industrial and Commercial Purposes - Challenges and Opportunities.	Bert Phillips phillips@unies.mb.ca

8	Refrigerants, Safety, Performances:	Gary Debes gary.debes@comcast.net
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- ➔ Potential program PROPSALS (with min. 2 speakers for a seminar)
- The influence of IoT over ventilation control of enclosed spaces (Steve)
  - Wireless control to improve ventilation performance (Steve)
  - Revising Bob's paper on Jet fan control optimization (Bob)
  - Best practices for Enclosed Vehicular Facilities ( Thomas)
  - Air curtain (Greg)
  - Underground Parking Garage issues + EV hazards (suggested by Lyle on Jun. 2021)  
➔ Yoon might be able to provide a presentation
  - High speed and pressure issues + introducing/promoting the new standard (suggested by David on Jun. 2021)  
➔ David volunteer to prepare a proposal for a workshop  
Review over the status\_national/international
  - Train car ventilation concerning harmful agents/bacteria or virus (suggested by Andrew on Jun. 2021) ➔ Duncan and Andrew volunteer to prepare a proposal for a seminar (Duncan will also reach out to Jesse or others who might be interested in contributing)  
➔ discuss further in the coming meeting in July.

### Future Program Topics

Can Wireless Control Improve Ventilation Performance (Champion: Steve Presser)

Air Cleaning for Tunnels (Champion: Igor Maevski)

Extreme Events Ventilation Requirements (Champion: Greg Sanchez)

Best Practices for Enclosed Vehicular Facilities (Champion: Tom O'Dwyer)

Tunnel Ventilation Velocity Profile on Egress Calculations (Champion: Ahmed Kashef)

Matrix Development to Achieve LEED Certification in Station Design (Champion: Mohammad Tabarra)

Platform Screen Doors (Champion: Greg Sanchez)

Natural Ventilation Applications in Enclosed Vehicular Facilities (Champion: Mark Colino)

BIM in Tunnel Ventilation Design (Champion: Igor Maevski)

Special Ventilation Issues in High-Speed Rail Tunnels (Champion: Ian Ong)

Boundary Conditions for Tunnel Ventilation Modeling (Champion: Tom O'Dwyer)

Ventilation Design for Road Tunnels Based on Risk Analyses (Champion: Ahmed Kashef)

Perspectives on Design-Build Projects (Champion: Mark Colino)

**Rail, Road, and Mass Transit Ventilation "concepts" under extreme events - harmful agents, aerosols, bacteria and virus. (Greg Sanchez)**

Considering the current events where harmful substances may be exposed to a large mass of people, either in a rail or road tunnel, or in a mass transit train station or a bus station while waiting for service or while using the service, it is within the scope of TC 5.9 to address issues where emergency ventilation to these extreme events may require a special sequence of operation and strategy. As such, TC 5.9 opens session where engineers, scientists, and owners are free to present their ideas that may have an impact or may benefit the general public, as well as the owners of the systems. Pros and cons of various technologies or concepts may be presented.


**Platform screen doors(Greg Sanchez)** Quite often, a major system is focus on a major event and small pieces of the systems will need to rely on secondary/supplemental devices, such as air curtains, platform screen doors, jet fans. This session will invite engineers, scientists, owners, to present innovation, challenges, requirements, special conditions where any of these devices have been used, needs to be used, may be considered as an option pending certain modifications to meet requirements. Basic design principles, specific test and commissioning requirements, potential benefit to help save energy and improve the environment for the patrons. On systems that platform screens doors may not be practical, would air curtains or jet fans be applicable? What the benefit of **platform screen doors** is and what to do to mitigate infiltration/exfiltration during the dwell time?

Assessment of tunnel and station **way side pressure transient** and the impact it has on exposed equipment - dampers, fan, jet fans, doors, signs. (Greg Sanchez)

When installing equipment in the proximity of the right of way of vehicles, the vehicle piston exerts a force 90 degrees from the traveling direction, which varies depending on the frontal area, the vehicle frontal area, and vehicle velocity, and the tunnel wall finishes. This also plays a role on patrons standing near the edge of the platform while waiting for the arrival of a train, or mass transit vehicle. The session invites engineers, scientists, owners to present case studies, concepts, numerical analysis, experiments, or requirements to assess the impact this phenomenon may exert on the various pieces of equipment, or even the patrons. This would help identify standard's needs, design requirements, or potential further research.

## RESEARCH TOPICS

	Research Project	Stage	Champion	6/25/2019	6/18/2020	01/26/2021	4/27/2021	6/29/2021
1	Thermal comfort requirements for metro and railway station platform areas for normal ventilation	Pre-RTAR	Tom O'Dwyer	Awaiting public comments for SPC 217 for input before proceeding	The standard will be published shortly and public comments have been addressed.	SPC 217 Standard has been published	David to reach out to Tom	Tom does not have the bandwidth to lead effort. Looking for new volunteer.
2	Emergency ventilation for alternative fuel and driverless vehicles in a fire scenario in tunnels and parking garages	Pre-RTAR	Duncan Phyfe	FHWA is interested in the topic and is creating a committee. Possible co-sponsorship with FHWA, NFPA Research Foundation. Look at NFPA 2. Look for other paths for co-sponsorship. Focus on ASHRAE relevancy, i.e. vented fires. NRC Canada has been performing research in fire detection and fire fighting of alternative fuel vehicle fires.	PIARC is also looking into alternate propulsion - Peter Sturm – Opportunity for co-sponsorship  Norris Harvey and Ahmed Kashef are corresponding members for PIARC	NFPA 502 looking at this issue for the Annex  PIARC - Ahmed to reach out to Peter Sturm  Norris is a part of the alternative fuel vehicles working group –  Co-sponsorship opportunities	David to reach out to Ahmed - Copy in Duncan  David to reach out to Norris, copy in Duncan	Check in with Ahmed and Norris. Talk to TJ and Yoon to see if there's any interest.
3	Comprehensive tunnel ventilation systems inspection requirements for NTIS program.	Pre-RTAR	Igor Maevski	Enhancement of NTIS standard for inspection for mechanical and electrical aspects of tunnel ventilation system. Possibility of co-sponsorship from FHWA	Stephen Bartha from FHWA is involved in the tunnel inspection program and attended the meeting – opportunity for co-sponsorship. See meeting notes.	First, David to reach out to Stephen, copy in Igor, see what type of co-sponsorship opportunities there are.	First, David to reach out to Stephen, copy in Igor,  Look for program – Safety of Tunnel and Systems – Europe – Requirements/Tunnel Ratings Synthesis study to incorporate	FHWA looking to update TOMIE. FHWA has requested funding for updating TOMIE and to develop training for next year. ASHRAE could provide industry input (consultants, owners, manufacturers.) To be discussed in further detail next S/C meeting.
4	LEED requirement/certification for station design based on ASHRAE 90.1	Pre-RTAR	Matt Davy		Mohammad Tabarra original author of previous RTAR. Will work with Matt and Jarrod Alston to resurrect.	David to reach out to Matt to determine progress.	David to reach out to Matt to determine progress. Does Matt want to take over the task of developing if Mohammad and Jarrod are not interested.	Matt to check with Mohammad and Jarrod on progress.
5	Review role of Phase 1 Integrated Design of EVS-FFFS in Highway Tunnels – Funding mechanism.	Post-award	David Hahm	Reach out to MORTS	Stephen Bartha is filling in the role of Bill Bergeson for FHWA and attended the meeting. Additional tasks have been awarded. FHWA looking to form	ASHRAE TC5.9 is on the technical review panel. Project is progressing, TC5.9 has provided comments for the draft test protocol, literature survey	Meeting held in March to review and discuss Draft Computer Modeling Report. Review comments were submitted to FHWA.	Meeting invite in July to discuss overview of project. Wrapping up computer modeling report. Lab – scale funding is

					review panel with one point of contact from TC 5.9. See meeting notes.	and synthesis, progress meeting, workshop report documents.		approved and scheduled for mid to late Fall. End date March of 2022. Progressing well.
6	Phase 2 for Integrated Design of EVS-FFFS in Highway Tunnels	Pre-RTAR	Igor Maevski	Full scale fire tests – Memorial Tunnel		Dependent on first phase.		
7	High Speed Pressure Transients	Pre-RTAR	Andrew Louie	Obtain PSD RTAR to determine if there is relevant information for pressure transients in high speed rail.	Previous RTAR is uploaded on Basecamp.	Consult with manufacturers for pressures suitable for equipment (signage, dampers, etc)		Start with new RTAR.
8	Reduced Atmosphere Type Systems	Pre-RTAR	Sean Cassady				Possible synthesis for the topic.	Will update next meeting.
	<div> <div> <b>Topics for Further Development</b>  </div> <ul style="list-style-type: none"> <li>• Station Thermo Comfort</li> <li>• Virus and Bacteria Protection of Stations</li> <li>• High Speed Rail Aerodynamics and Ventilation</li> <li>• Freight Tunnels Ventilation</li> <li>• Alternative Fuel Vehicles Emissions / Ventilation <ul style="list-style-type: none"> <li>• Road</li> <li>• Rail</li> </ul> </li> <li>• Hyperloop? Other Type of Tunnels?</li> <li>• Assets Management</li> </ul> </div> <p>SPC 217 Groups – Topics can be developed for the Subgroups</p>							

David Newman	TC Voting Member
Matthew Davy	TC Voting Member
David Hahm	TC Voting Member
Dimitry Kogan	TC Voting Member
Bill Lampkin	TC Voting Member
Andrew Louie	TC Voting Member
Duncan Phyfe	TC Voting Member
Yoon Ko	TC Voting Member
Simona Tsvetkova	Corresponding Member
Jane Miller	Corresponding Member
Tom O'Dwyer	Corresponding Member
Igor Maevski	Corresponding Member
Yuan Li	Corresponding Member
Sean Cassady	Corresponding Member
GS Presser	Corresponding Member
Kevin Chang	Corresponding Member
Salvatore Marsico	Corresponding Member
TJ Lyle	Corresponding Member
Olivia Volker	Provisional Corresponding Member
Harris Raharja	Guest
Danielle Johnson	Guest
Kevin Marple	Guest
Mina Samimi	Guest
Ana Marie Ruiz Jimenez	Guest
Bernd Hagenah	Guest
David Parker	Guest
Jacob Carr	Guest
Stephen Bartha	Guest
Yunlong Liu	Guest
Triet Tran	Guest