

**Meeting Minutes**  
**ASHRAE 2021 Summer Meeting – Virtual**

**TC 7.1 Integrated Building Design**

**Scope:**

TC 7.1 is concerned with facilitating interaction among all building disciplines, from earliest concept development throughout the building life cycle, in order to achieve integration of design efforts and operation of the total building.

**Subcommittee Meetings:**

Research –Program-Handbook WEB meetings

**Virtual Programs:**

**Main Committee Meeting:** Monday June 21, 2021 - 9:00 a.m. - 11:30 p.m. **Virtual** [Central Standard Time]

Name	Affiliation	TC Membership	Status
Elyse Malherek	Willdan	VM, Chair/Webmaster	Present
Russell Taylor	Carrier Corporation - BSG	VM, Vice Chair/Research	Present
Joe Furman	Carrier Corporation - CCS	VM, Secretary	Present
Sergio Sádaba	Stantec	Incoming Secretary	Present
Kevin L Amende	Montana State University	VM	Absent
Jason Atkisson	Affiliated Engineers	VM	Present
Lianne Cockerton	Martin Roy et Associés (MRA)	VM/Handbook Chair	Present
Suzanne Levisieur	Haddad Engineering	VM	Present
David Allen	Allen Consulting	TC 7.1 Facilitator/Trainer	Absent
Danielle Monfet	ÉTS Montreal – Univ. of Quebec	VM	Present
Satheesh Kulankara		TAC 7.0 Section Head	Present
Brian Krafthefer	BCK Consulting	2023 Handbook Liaison	Present
Billy Austin	Shultz Engineering Group	TC9.6 & TC9.8 Liaison	Absent
Chuck Gullledge	Environmental Air Systems	Guest, ASHRAE President	Present
Joe Chin	Western Allied Mechanical	CM, TC 7.2 Vice-Chair	Present
Mitchell Swann	Resolution Management Consultants	CM	Absent
Marianna Vallejo	Jacobs Engineering	Program Sub-Com Chair	Present
Akash Patel	Volpak Systems	CM	Present
Juliana Pelegrini	Studio Symbios	CM	Present
Heather Schopplein	UMEC	Guest, TC9.8 Member	Present
Kevin Ream	Wohlson Construction	Guest	Present
Costas Balaras	National Observatory of Athens (NOA)	Guest	Present
Keith Hammelman	Cannon Design	Guest	Present
Martin Weiland	GSA	Guest	Present
Jaydeep Bhadra	Loughborough University	Guest	Present
Elangovan Shanmugam	Intuit	Guest	Present

Jonathan Wooley	Emanant Systems	Guest	Present
Filza Walters	Lawrence Technological University	Guest	Present
Victor Bong	Swinburne University of Technology	Guest	Present
Nathaniel Bolton	Fitzemeyer & Tocci	Guest	Present

VM – Voting Member   CM – Corresponding Member   PCM – Provisional Corresponding Member

### Main Committee Meeting:

A. Call to Order – Malherek – 9:00AM CST [10:00am EST]

B. Roll Call – Malherek

- Quorum was Present

C. Introductions - Malherek

D. Review of Agenda - Malherek

E. Approval of Minutes from Summer Virtual Meeting 2020 – Malherek

- Approval conducted by Email Vote so that voting members have a chance to review

G. Roster Review- Malherek:

- Elyse Malherek will roll off as Chair and continue as Special Publications Chair and Webmaster
- Joe Furman will move from voting member to non-voting member
  - Russell Taylor and Joe Furman are part of the same corporation now.
- Chuck Gulledge will now become a voting member replacing Joe Furman
- Joe Chin will now become a voting member replacing Kevin Amende
- Sergio Sádaba will start as Secretary replacing Joe Furman

H. Subcommittee Reports

1. Handbook – Lianne Cockerton –

- Requests volunteers to update the 2023 Handbook
  - Elyse Malherek volunteered to assist in editing the volume
  - Chapter already went through a major update in the previous volume
- Brian Krafthefer (TC 7.1 Handbook Liaison) requested access to BaseCamp

2. Research – Danielle Monfet

- 1801 – Standardizing and Utilizing ASHRAE Online BIM Data Exchange

3. Programs – Marianna Vallejo: Will review Tracks for Las Vegas

- Deadline is 02Aug2021 for Program Submissions
- Marianna will set up a subcommittee call
- Martin Weiland, Joe Chin & Chuck Gulledge review/participate in potential program submissions

4. Special Publications – Malherek

- Integrated Building Design Applications Manual
  - Mitchell, Julianna met on 05Mar2021 & 18Jun2021 to review
  - Work is in progress
  - Chuck Gulledge volunteered – would like to expand scope for current relevance

- Publication Proposed by Howard McKew “A Practitioner’s Guide to Management in the Building Industry”
  - Scrapped as an ASHRAE Book, but may pursue Books from Other Publishers
- Project facilitator tools/tips – Possible Research Project
  - Elyse looking for volunteers
  - Mitchell -AIA may have some documents that review this subject
  - Volunteers – Mitchell Swann & Dave Allen
  - Opportunities to create Publications & Certifications – Work in Progress
- Webmaster – Elyse – Website Current
  - Send request(s) for TC7.1 BaseCamp Access

## I. Old Business

- TC Title Update – Elyse
  - Current Title: Integrated Building Design
  - Current Scope: TC 7.1 is concerned with facilitating interaction among all building disciplines, from earliest concept development throughout the building lifecycle, in order to achieve integration of design efforts and operation of the total building.
  - Proposed Title Option 1: Integrated Project Delivery and Building Design
  - Proposed Title Option 2: Integrated Building Design and Project Delivery
  - Unchanged Scope
  - Discussion
    - Martin Weiland – Does this title cover Full Life Cycle?
    - Furman – Ad Hoc should be created and tasked for further review
  - Created Ad Hoc to Review Name Change
    - Elyse Malherek – Chair
    - David Allen - Member
    - Lianne Cockerton - Member
    - Chuck Gullede - Member
    - Sergio Sádaba - Member
    - Mitchell Swann - Member
    - Russell Taylor - Member
    - Martin Weiland - Member
- TC 7.1 Liaisons to Other Committees:
  - BIM MTG – Malherek
    - Looking for Active Participants
    - Gullede – This committee could significantly contribute, e.g. 60 BIM relevant to our industry
  - 205 (Standard Representation of Performance Simulation Data for HVAC&R plus Other)
    - Expanding Equipment for Energy Modelers
    - Publication coming out
- Section 9: TC7.1 liaison(s) to the indicated TC of Section 9:
  - TC9.1 – Large Building Air-Conditioning Building - Nothing to Report
  - TC9.4 –Justice Facilities - LeViseur – Part of TC9.8 Now - Nothing to Report

- TC9.6 – Healthcare Facilities: Austin – Nothing to Report
- TC9.7 – Educational Facilities – Keith Hammelman – Nothing to Report
- TC9.8 – Large building Air-Conditioning Applications: Austin – Nothing to Report
  - Heather Schopplein – New Name for TC9.8
- TC9.10 – Laboratory Systems: Atkinson – Nothing to Report
- TC9.11 – Clean Spaces: Mitchell. Nothing to Report
- TC1.7 - Business Management & General Legal Education – Mitchell (Nothing to Report)
- TC7.2 – HVAC&R Construction & Design Build Technologies
  - Mitchell Swann/Joe Chin – No report
- TC2.5 - Global Climate Change – Nothing to Report
- TC2.8 – Building Environmental Impacts and Sustainability – Juliana Pellegrini
  - Finished Green Guides updates [FTC]

#### **J. New Business**

- Putting IPD Requirements in codes (see email from 189.1 and Appendix F from Standard
  - Tom Lawrence Request for Assistance (See Appendix)
- TC Chairs Breakfast Updates: Kulankara
  - Conduct Virtual Meetings Between Now and Winter Meeting

**J. Next Conference Meeting:** Monday, January 31, 2022, Las Vegas, NV

Meeting adjourned 10:34 am CST [11:34 EST] Russell Taylor Moved, Sergio Sádaba 2nd

**Submitted By: Joe Furman 21Jun2021**

## Appendix

I am on a working group within SSPC 189.1, the committee maintaining Standard 189.1, that is looking at revisions to an Informative Appendix on Integrated Design in the Standard.

Costas Balaras (from Athens Greece) gave me your contact information and those copied here as he said he had attended the virtual TC 7.1 meeting last January.

I have been involved with the 189.1 Standard since the beginning and although we wanted to find a way to somehow 'require' Integrated Design (for a high-performance building), but could not find a good method for that and thus we settled for this Informative Appendix F.

We are reconsidering this issue now again. Issues we are dealing with include:

- How to incentivize the use of Integrated Design (actually a Code either requires or forbids something, so it will need to be more along those lines)?
- Where in the Standard would we put a reference to such a requirement?
- How to adapt to the various building project delivery mechanisms (design-bid-build, etc.)?

Among others.

We were wondering if TC 7.1 has considered issues like this, in particular how it would fit into a Standard and then a Code, and would be interested in hearing your thoughts.

If there are good points/suggestions to pass on, perhaps someone from the TC could present them to the next working group meeting we will have (sometime in July, date and time TBD).

Thank you,

Tom Lawrence, Ph.D., P.E.

(This appendix is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

## INFORMATIVE APPENDIX F

### INTEGRATED DESIGN

#### F1. INTEGRATED DESIGN PROCESS/INTEGRATED PROJECT DELIVERY

Integrated design, and related concepts such as integrated project delivery and integrative design, leverages early stakeholder collaboration through the sharing of knowledge and expertise among project team members to develop stronger, more balanced design solutions. This integrated design process stands in contrast to traditional design methods, where there is limited use of the skills and knowledge of all stakeholders. An integrated design process provides increased predictability of project outcomes earlier and enables the construction of high-performance green buildings that consume fewer resources and provide better comfort and functionality.

Integrated design introduces major issues and key participants into the project early, where more opportunities occur for creative problem solving. The complex interactions of sophisticated building systems require early coordination to maximize their effectiveness and output. Early team building and goal setting may also reduce total project costs. The collaborative process can inform building envelope, mechanical, electrical, plumbing, and other building system design. The later in the design process that systems are introduced, the more expensive their implementation will be. Information technology can also be a valuable asset in increasing predictability of outcomes earlier in the project and is recommended for all integrated teams.

In contrast with a linear design process, which addresses problems sequentially, an integrated process approaches each problem with input from the various viewpoints of the participants and the domains they represent, circling back after each design decision to collectively evaluate the impact on all stakeholders. This process acknowledges the complex interdependency of building systems and their relationship to resource consumption and occupant well being.

Several existing, and currently evolving, models for collaboration should be considered, including ASHRAE Handbook—HVAC Applications, Chapter 57; the MTS 1.0 WSIP Guide, Whole Systems Integrated Process Guide for Sustainable Buildings and Communities; and Integrated Project Delivery: A Guide by the AIA and AIA California Council.

Project-specific integrated design and/or integrated project delivery processes should be determined with full participation of the stakeholder team. What works for one project may not be the best approach for the next. Additionally, the team should collectively identify the performance standards and the associated metrics by which project success will be evaluated. Design charrettes of varying duration may be an effective tool to consider, though ultimately it is the responsibility of the stakeholder team to determine the process that will best fit a specific problem or project.

F1.1 Design Charrette. The following outlines one type of design charrette process that resulted in a successful integrated design. A charrette process can be initiated at the initial stages of building design, and the members of the process should include all stakeholders.

F1.1.1 Charrette Process. Experienced personnel representing each specialty should participate in the charrette process. A discussion of all systems and all items that affect the integrated design should be discussed. Stakeholders should be able to decide and vote on the best integrated system.

The integrative team process should entail the following steps of design optimization:

- a. The original goals and budget of the project should be revisited to see whether the overall intentions of the project are intact.
- b. The project should be compared with this standard or at least one existing green rating system.
- c. Each of the building and site components should be scrutinized to help ensure that natural systems for energy conservation, lighting, ventilation, and passive heating and cooling are maximized before mechanical systems are engaged.
- d. The appropriateness and integration logic of the building's primary systems should be confirmed.
- e. The impact of the design on the site and its larger context should be evaluated, including the environmental impact on a life-cycle cost basis.
- f. Building information modeling (BIM) software, design tools, and the experience of the design team should be used, where practical, to help optimize the design.
- g. All members of the design team should be included when making design decisions.
- h. Commissioning and consideration of future operation and maintenance (O&M) requirements should be included within the design optimization process.

F1.1.2 Design Charrette Matrix. At the end of the charrette process, a matrix for each proposed building scheme can be developed and evaluated to summarize the impact on the site, water, energy, materials, and indoor environmental quality and to help in deciding on the best integrated system. The matrix contains cells indicating the high-performance value, grading a particular building system to its appropriate high-performance criteria. Each high-performance value is qualitatively rated from 1 to 10, with 1 being the lowest (minimal energy savings, low air quality, low water efficiency, high cost) and 10 being the highest (high energy savings, high air quality, high water efficiency, low cost). The average of the high-performance values for each building system is the aggregate index. Selection of the best system should be based on a comparison of the aggregate indices for each matrix.

Scheme #1—with Atrium, maximum exposure on the south, three-story office building.

High-Performance Criteria							
Building System	Site	IAQ	IEQ	Energy	Comm. M&V	Initial Cost	O & M
Arch	8	7	6	1	6	1	6
HVAC	—	5	6	2	6	2	7
Plumbing	NA	—	—	—	—	2	7
Structural	—	—	—	—	—	2	
Aggregate index	8	6	6	1.5	6	2	6.8

Result:

Least numbers under energy and cost column defines consumption of substantial energy with high initial cost.

Scheme #2—without Atrium, three-story, minimum exposure on the south and west side.

High-Performance Criteria							
Building System	Site	IAQ	IEQ	Energy	Comm. M&V	Initial Cost	O & M
Arch	6	7	7	7	7	7	6
HVAC	NA	5	7	7	7	7	7
Plumbing	NA	—	—	—	7	7	7
Structural	—	—	—	—	—		
Aggregate index	6	6	7	7	7	7	6.8

Result:

High numbers on all columns indicate the building is conceived optimally.

Figure F-1 Sample charrette design matrices.