Transcript
Single Exit Stairway Apartments TAG 6.26.2025

[Speaker 3] (0:06 - 0:50)
Morning everyone, my name is Greg Metz. I'm an assistant director at the Construction Codes and Licensing Division of the Minnesota Department of Labor and Industry, and I'm also the state building official. I'm here to lead the technical advisory group for single egress stairway apartment buildings.

This is a study technical advisory group, so we are not rulemaking today, and it is 9 a.m. and it is June 26th, 2025. And we will start by taking roll. Ryan, can you go through the roster?

Mary Barnett.

[Speaker 18] (0:50 - 0:50)
Here.

[Speaker 14] (0:51 - 0:56)
Tom Brice. Here. Nathan Bruin.

Here. Adam Casillas.

[Speaker 15] (0:56 - 0:59)
It doesn't look like he's here.

[Speaker 14] (1:00 - 1:06)
Nick Erickson. Here. Patrick Behrens.

Here. Jeff Fisher.

[Speaker 15] (1:09 - 1:12)
Is it Jim Fisher? He's not here today.

[Speaker 14] (1:13 - 1:24)
Jim, I'm sorry. Stephen Karteck. Here.

Greg Metz. Here. Jerry Norman.

Here. Tom Fischneider. Yep.

Melissa Rodriguez.

[Speaker 7] (1:25 - 1:25)
Here.

[Speaker 14] (1:25 - 1:30)
David Salinski. Stephen Smith.

[Speaker 16] (1:34 - 1:38)
He's online. You can unmute yourself, Stephen. Did you hear him?

I didn't.

[Speaker 14] (1:38 - 1:40)
Yeah, I'm here. Okay, perfect.

[Speaker 16] (1:40 - 1:41)
Thank you.

[Speaker 3] (1:41 - 1:42)
Amanda Swanson.

[Speaker 14] (1:42 - 1:42)
Here.

[Speaker 3] (1:42 - 5:40)
Thank you. Greg. I also want to recognize our consultant team.

We have Carl Baldassare, Kyle Christensen, and Nick Ogazog. And we have Brian Meacham online. Brian, are you available?

Here. Thank you, Brian. All right.

So just to give a little context for this. Those of you that are part of the technical advisory group probably know this, but for anybody who may be tuning in for the first time, the 2023 legislative session funded a study to make an empirical fire safety risk assessment for single exit stairway apartment buildings constructed up to 75 feet in height. So the purpose of this technical advisory group is to provide input into that study.

So that's what we'll be doing today. The TAG representative groups were assigned by the state legislature. So each member of the technical advisory group, remember, represents a group.

So remember, when you're sharing opinions, you're sharing opinions of your group. In addition to yourself, you're a representative. So just keep that in mind.

Just a reiteration. I've said this a lot. This technical advisory group is not rulemaking.

We're here to advise and inform the fire safety risk assessment study. The study will ultimately make some recommendations moving forward, but even those are not rulemaking in and of themselves. This will go back to the legislature on December 31st or thereabouts, if that's the deadline date for that as a final report.

And they will determine at that point whether they want to move forward with proceeding. We as DOI CCLD will not move forward with rulemaking for anything higher than we've already talked about in the Minnesota Rule 1305 for single exit stairway apartment buildings unless we are directed to do so by the state legislature. So the 1305 technical advisory groups, which is the commercial building code for the state of Minnesota, has had their technical advisory group meet and they have concluded their work.

So that will not reconvene unless we're directed to do so by the state legislature. The scoping of this particular study will include comparative risk assessments between what is currently allowed by code and a proposed model including analysis of various types of failures and additional safety features. And we will get into that today.

So this final study will include considerations, as I mentioned, for rulemaking based on those risk assessments that are found and the recommendations or conclusions that can be drawn from the empirical data that comes forward through the study and through the fire modeling process. This is a public meeting, which means that the public has an opportunity to view and access all of the discussions. Because this is a hybrid meeting and the public is also invited to attend online, just like we have technical advisory group members, all the chat functions online are disabled.

So all of the conversations are verbal and live. So everyone can hear all of the conversations that are going on. And we have microphones, so we can't really just wrap here without anybody hearing.

So that is what it is.

[Speaker 15] (5:40 - 5:44)
I should just add that you can send me a chat message if you're having any kind of difficulties.

[Speaker 3] (5:45 - 10:40)
Thank you, Lindy. So if somebody online is having problems, send a chat message and Lindy will see that and we'll go forward with that. So the TAG members who are online, feel free to mute and unmute yourselves at will in order to participate in the conversation, just as if you were sitting around the table.

So you don't have to raise your hand. Just chime in and we will accommodate that. We would ask you that you stay muted if you're not talking, just because it eliminates feedback and various audio problems.

So that's helpful. This TAG is available for public viewing and listening, but public participation, but not public participation, because the required participating stakeholder groups were identified in the legislation. So the discussion today is going to be around the table as a public meeting, and that is appropriate and well and good.

So we have some objectives today that we want to move forward with for the technical advisory group. So our goal is to ensure that our technical advisory group reaches a consensus on a code complaint baseline that we're going to use for comparison risk assessment. So we've got a couple options, and we're going to pick through what we want as the baseline for what we determine today as code complaint, because we'll get a risk assessment and there's going to be a number assigned to that.

So that's going to be the number we're comparing to for risk. We need a TAG consensus on a FHIR study model for risk assessment. So this is the study model that our consultant team is actually going to model in the FHIR software.

So we have limited funds from the state legislature, so we can't model everything under the sun. So we as a group need to determine what exactly we want them to model. So we want to make sure that what they're modeling is consistent with what makes sense.

And, you know, for moving forward for what we want to study, we may not agree with, you know, and I know some technical advisory group members aren't agreeing with, you know, moving forward with this at all. But that may inform what you want to do or what you want to see as modeled. So we need to go forward with the study because it's legislatively mandated.

So what we want to make sure is we want to make sure that we reach a consensus on what this FHIR model is actually going to be. And so that will be part of our group for this. So it will include size, height, number of stories, units per story, things like that.

And we'll get into that later on as we go forward. We'll probably spend a chunk of time on that. We also have some variations to the study model that we'll talk about and look at options for that.

And then some feature overlays or modifications that we want to be modeled. And, again, we'll go into greater detail for that. But that's our objectives is to make sure that when we walk out of this technical advisory group today, we all have a clear understanding of what we've agreed to that this FHIR model is going to be and the basis of comparison for the different systems.

So our next steps, we're going to compile notes from this TAG meeting and work with our consultant team to prepare a draft report. I'm still in the process of figuring out how I want to share that with you, because we don't want this draft report to become public knowledge before it's available to the general public as a final document. So in all likelihood, we'll have another technical advisory group meeting sometime in December with the pre-final report, because we want your final comments with regards to what the study actually came up with, and we want you to be well informed of what this is before we actually submit the study to the legislature.

But we don't want it to necessarily become public knowledge and publicly available in its pre-final form, if that makes sense. So we're still kind of working out how we're going to do that. And again, as I mentioned before, we'll submit the final report to the state legislature probably on Tuesday, December 30th, just to give us a little grace, because it's due on the 31st.

So I think we can move forward with the next agenda item piece.

[Speaker 2] (10:42 - 10:45)
If you could pull up the presentation.

[Speaker 18] (10:45 - 10:45)
Oh, you bet.

[Speaker 2] (10:51 - 13:37)

So to start things off, just on behalf of our consultant team, thank you for this opportunity to work with the state of Minnesota and then all the distinguished members of this TAG. These past few months have been excellent. Having had the pleasure to speak with many of you, learn from you, and share data and experiences that you all bring to this TAG.

We continue to believe that Minnesota's approach to this question of a single exit multifamily occupancy is a good approach by conducting this study and convening the TAG. We have a lot to present today. None of this information is final.

And we have open minds for this study. We look forward to hearing from the TAG in more detail as we look, especially from my perspective, on the draft floor plans. And with that, we'll start.

So thank you very much. Next slide, please. Next slide.

Next slide. So, again, as Greg kind of hit on where we from the last TAG meeting, number one, we had the opportunity to interview the TAG members, collect data, papers, reports. I will get into some of that literature review that we've done.

We've looked at defining some fire scenarios that the data has kind of led us to. Investigated reliability and operability of various mitigation systems that we've found in the data, as well as heard from TAG members. And present and we'll show some model geometries.

Next slide, please. Again, for today, we're going to recap the risk-informed approach, what that is and how this study was selected and how this consultant team is approaching it. Conduct interview takeaways.

And then insights from national data, as well as then get into the model geometries that we're proposing to model and study based on input from the preliminary TAG interviews. As well as data that we had access to and kind of putting all that together. Next slide, please.

Then after this, we'll evaluate the feedback received today. Finalize the floor plan geometries that we are modeling. Continue to review probability data.

Look at the event tree. The model will inform the consequences that will go into the event tree after we conduct the model. And then, of course, prepare the draft report.

Next slide.

[Speaker 1] (13:40 - 13:44)
Yeah, thanks, Nick. So before we dive in.

[Speaker 16] (13:44 - 13:50)
Can I just stop you guys real quick? If you could just state your name before speaking each time, it makes it much easier when we do our notes after the meeting. Thank you so much.

[Speaker 1] (13:50 - 15:32)
This is Kyle Christensen. Next slide, please. Before we dive into our presentation today, I just wanted to kind of recap our approach for this study.

So, you know, our goal is to assess the risk differences between two-stair multi-unit residential buildings and a single-stair multi-unit building. And our objectives are to understand where fires are starting, how many people are dying in them, how many firefighters are becoming injured. Basically identify the circumstances where civilians are dying and firefighters are getting injured.

So we start that by doing a literature review, understanding data, looking at trends, trying to develop insights about what systems are significant, where are the types of buildings where we're seeing large amounts of civilians dying or firefighters becoming injured, and what systems help mitigate those consequences from occurring. We'll look at the likelihood of different end states occurring. So say that the sprinkler system fails and someone leaves their dwelling door open.

What is the probability of both of those faults occurring? Then that will inform then what we do for the fire scenarios and how we evaluate those consequences. And then we'll perform that comparative risk assessment to baseline against what is allowed in the code today.

And then with our hypothetical single-stair building, how do we compare those two risks? And then we want to be able to recommend what did we see were the risk-significant mitigating systems in this study. Next slide.

[Speaker 2] (15:37 - 19:00)
Nick Ozog, from this standpoint, we're looking for significant as an overview from the interviews that we had with the TAG members. First and foremost, thank you for taking the time to meet with us, to pull data, meet with the various other members of your TAG that you're representing today. The interviews were very helpful in guiding us with what concerns specific to the state of Minnesota there were on this topic.

So first and foremost, thank you very much. Second, we're going to get into some of the significant input and efforts from the group, as well as it's not too late to reach out to us. Yes, we're on a time frame to keep this report on task as it's given to us, but it's not too late to reach out if you see anything.

Unofficially, Monday would be great, but sooner than later if you have significant impacts on what comes out of today. Just a quick overview summary. We took notes throughout.

We didn't record any of the interviews, but we did take notes. In compiling the notes from all the interviews, creating a word cloud, we saw maintenance, sprinkler systems, where the data comes from, systems, department, staffing, failures, kind of came up and was a resounding theme from what we heard from all the TAG members. Next slide, please.

Just some quick hits on a few of the items not organized by any one TAG member or any one group that is represented via TAG, but a focus on look at Minnesota-specific data, which thanks to many of the TAG members we were able to get. And then oftentimes other failures in human behavior are part of this. How that's modeled, we're still considering that, but it is a factor in the human aspect of all of these issues.

Next slide, please. As well as the variability of enforcement, inspection, and reporting that goes on in the state and how that could have significant impacts on system reliability that Kyle will talk about a little bit later. Also, desire for flexibility with unit sizing within various floor plates.

If a single exit stair building is desired to go above what is currently allowed. And then look at existing examples from other jurisdictions that already have this. Next slide.

And then last, look at the data a little bit more. Many of the TAG members have provided context to the data so things aren't just numbers. As well as continue to look at inspection and maintenance.

Again, that was a hot topic that came up in many of the TAG interviews. And then look at design tradeoffs between safety, cost, and practicality. The safety question is for legislative and others to decide, but we're providing some risk context.

That comes from data. And with that, I'll turn it over to Kyle.

[Speaker 1] (19:00 - 41:37)
Kyle Christensen. I wanted to start by looking at a national data before going into the Minnesota specific, just to provide some context for where Minnesota stands. When we conducted our literature review, we looked at over 40 papers, reports, journal articles.

Not focusing just on domestic. We wanted to see what international work had been done. Because we know there's been a lot of studies on single stair buildings way over six stories internationally.

So we wanted to get a good understanding of what have they used for their design approaches. So we reviewed all that information and compiled it. We also, again, as Nick said, appreciate the interview feedback we got from the 12 interviews we conducted with the TAG.

That also factored into our data assessment. And you all provided some great information to us that you'll see summarized here today. And, again, just thank you to the people who, this is not an exhaustive list, but just thanks for those organizations that did provide us data.

Next slide, please. So we reached out to the National Fire Protection Association for some fire event data. Because when we looked at what was available online, there was a lot of, I would say, higher level generic information about one or two family homes and some apartments.

But we really wanted specific to multifamily dwellings. Because we got Minnesota information for multifamily dwellings. We wanted to have as like a comparison as we could get.

So we contracted with NFPA for them to perform a custom analysis for us, where they gave us a data set from 1999 to 2023 for fires and multifamily dwellings. They did identify some of the limitations in their reporting that they estimate from their NFIRS data. They're only able to capture about 70 percent of the actual fire events.

So they use a scaling multiplier to then annualize that data to more truly represent what they believe the number of events to be. They also were quick to identify that the number of exit stairs in a building is not available in the data sets. And that was something similar, too, with the Minnesota data.

So we do not have that as an explicit variable when we're looking at our study. There's also some context for how the users input data and that we rely on fire departments to populate this data. And some user may interpret one versus another.

We also find that with open buildings now or open floor concepts, it can be a little more of a judgment call for the fire department to understand where the fire started. So that can be difficult when you're trying to assign the confidence in this data. So that's something that we need to take into consideration as we're drawing conclusions in terms of how reliable this data can be.

The NFPA data from a national perspective also did not have firefighter injuries, but the Minnesota data did. So I will cover that in the Minnesota section, but that was not available on the national scale. Next slide, please.

So we wanted to benchmark first the number of fires that occur in apartment buildings and in one and two family homes. And this is taken straight from the National Fire Protection Association's website where they conduct these studies. And you can see that there was a they were high in about 1980, and then they have dropped and almost stabilized a little bit starting from 2000 to the 2020.

And you can see that the number of fires in one and two family homes is significantly greater than apartments. And that, I would say, is to be expected. There are more one and two family homes in the US compared to apartments.

Next slide, please. But this was, I say, a more illuminating slide where you're looking at the deaths in these types of buildings per thousand fires. And you can start to see some separation between the one and two family homes, which in 2020, 2021 was around nine point five deaths per thousand events versus apartments.

That was around four point nine. And there's been a since, I would say, 2000, a pretty steady separation between the two. And that apartments consistently have a lower death rate per thousand fires than one or two family homes.

We wanted to put this in perspective and context for how we benchmarked our single stair building up to 75 feet, because we need to establish what is the control that's allowed by code. And we are making the decision to benchmark against an apartment building and R2 building and not against a one and two family home for this reason. And I maybe want to start out by giving an example that in the US, approximately 120 people die every day from auto accidents.

But if you looked at a plane with two hundred, two hundred and forty passengers going down, that gets much more national attention. And you can see the amount of safety measures that are applied to mitigate such a kind of disaster and air travel between the

pilots having to be trained security for the people boarding the plane. The rigorous maintenance schedules that the planes need to meet versus the driver in a car.

You had to pass your license test when you were 16 and then you are in charge of bringing your car in for maintenance. Some states have inspections, but it is predominantly on you and you are not receiving routine training on how to operate your vehicle. So how do you comport this?

How do we accept that people are tolerating the risk of getting into a car? But the risk of a plane accident, you know, there's significant deltas between those two. And in two days, the number of people have died in car accidents from one plane.

So on a parallel approach, you know, we're looking at two different sets of risks that people have accepted. And if you move into an apartment building, there is inherent additional protections in place to prevent a large scale event from occurring. And those same mitigation measures are applied to to prevent such an event from occurring that are not present in one or two family homes.

So when we're looking at the benchmark, we want it to be as consistent as possible that if we are looking at apartments for our single stair building, we wanted to benchmark that against apartments that are permitted by the code today. Next slide, please. So NFPA found that about half of fires in any type of home structure between the years 2016 and 2020 were related to cooking.

They started in the kitchen. But you can see from this graph the type of home fire deaths by origin and year that kitchen is at the bottom. So we have the most fire starting in the kitchen, but those aren't necessarily necessarily the most lethal.

And we're seeing that living room and bedroom fires have a consistently higher number of deaths than kitchen fires do. So that's something that we need to take into consideration when we're doing our modeling, that we not only want to focus on what fire is the most common. We also want to focus on the type of fire that is more lethal.

Next slide, please. So this starts looking at some of the data that we received from NFPA regarding the types of fires and civilian fatalities in multifamily housing. And this graph is separated by grouping buildings that were between one and three floors, four to six floors and seven plus stories.

And if they were sprinkled or not. And this tracks over time the number of deaths that have occurred over the past or I should say from 2004 to 2023 in these different types of buildings. And you can see that the predominant type of configuration of where civilians are dying are in buildings that are under or at three floors and are not sprinkled.

As soon as you add a sprinkler system into that three story or less building, the number of fatalities reduces significantly. And you also see that same trend for the four to six and seven plus floors as well. But even just looking at the graph, the number of people dying overall in these buildings is quite low compared to the three story up to three story buildings.

Now, we understand that there are more three story buildings in the in the U.S. compared to taller buildings. So on the next slide, I tried to normalize that data to say, OK, if we look at per fire event, how many people are occurring or are perishing? And so you can see in the blue and the circles that signifies a building that is three stories or up to three stories.

The orange squares are between four and six. The green triangles are seven or higher. And again, you can see that the death rate per thousand fires is still much larger for three story buildings compared to four to six story buildings or seven story buildings.

And I think there are some credit due to the codes that as soon as you start going up in elevation, there's additional safeguards that are required that are not required for buildings that are shorter. So you can see those trend lines is around five deaths per thousand fires. That's been pretty steady for the three story up to three story buildings.

And then you can see there's been a slight decline on four to six and seven plus stories. That's right between three and four deaths per per thousand fires. Next slide, please.

We also had the data from National Fire Protection Association on civilian injuries. And this is just looking simply at in red if the sprinkler was not present versus if the sprinkler was present between 2004 and 2023. And all of this data is for multifamily homes.

And again, you can see a large difference just in the terms of injuries that were reported in a building that was sprinklered versus a building that was not. Next slide, please. So this was an interesting one where we compared the number or if a smoke detector was available versus the number of civilian deaths.

And the blue is where the detector is present. And in gold or that yellow, there's no detector present. And this was a little eye opening because on first glance, you will see the trend is there are more people dying in buildings that have smoke detectors versus those that don't.

But so there's clearly not the same correlation as a sprinkler system. But then I want to say, could there be just a large number of fire vents in rooms or in buildings that have smoke detection in them? And when I say smoke detection, this is local smoke alarm.

This is not a building wide detection system. And so on the next slide, we look to normalize the data to understand if there was a trend to be had here. And you can see in blue when the local smoke alarm is present in gold.

It is not that you can see when you normalize it per thousand fire events, you get a trend. You would more expect that that smoke detector does make a difference in reducing the number of civilians that die on average in a fire event. It does not have as strong of a correlation as the sprinkler system.

And I think one of the reasons for that is it requires action from the occupant to evacuate or to put out the fire. The alarm itself is not doing anything to protect the occupant other than notifying them that there is a fire presence. Next slide, please.

So now I want to pivot to some of the Minnesota data and benchmark that against some of the national data. So we received data on residential fires in the state of Minnesota

between 2002 and 2025. And we decided to analyze the data from 2004 to 2024 just because 2024 had the last full year's data set.

And we started at 2004 because that's when NFERS, I think, went to version 5.0. So it had a more consistent reporting approach. So we used that time window to analyze our data. We found that Minnesota had very consistently high reporting from all of the Minnesota fire departments throughout the state.

It was well above 90 percent. So we felt that that offered a very robust picture and data set to use where we didn't need any scaling factors. We felt that this was giving a very comprehensive look at the data that we received.

And we also consulted with the reports that Minnesota Fire publishes every year. That gives a great summary of how fires have trended over the past five years, where are they seeing differences. So we took some of that data and incorporated that into our study.

Next slide, please. So to parallel what I just shared from the national perspective, you can see here just a number of fires in one and two family homes versus multifamily. It's a similar trend.

You're seeing many more fires in the one and two family homes versus the multifamily. Again, that's to be expected, just the sheer number of one and two family homes in the state versus the number of multifamily. Next slide, please.

When we looked at the normalized death rate for civilian fatalities per thousand reported events, again, you see a similar trend where the one and two family homes is around 11 per thousand reported events. And the number of multifamily is right around four. And so you can see there's, again, a big and steady gap between the normalized rates of one and two family homes, where civilians are perishing versus the multifamily homes.

Next slide, please. So we wanted to see in multifamily homes in Minnesota, where were the fires starting? And predominantly it's the kitchen.

And we listed the top nine areas here. And the kitchen was responsible, as we said, for the lion's share of those. And then it starts breaking down by bedroom, balcony, common room, laundry, and then so forth and so forth.

But, I mean, the big takeaway here is that the kitchen is where the most fires are starting. And then if you see the second is bedroom. If you remember from the previous national data, the bedroom and living room were where those most lethal fires were occurring.

And those are the second and fourth most common fires that we found in Minnesota. Next slide, please. And so that trend is reflected here, where we're looking at the number of civilian fatalities and where they occurred.

And again, the common room and bedroom accounted for almost 60 percent. And the cooking area, I should say, sorry, account for about 60 percent of the deaths that we observed from the data. Over the data set from 2004 to 2024, there were 138 civilian fatalities.

And so about 6 percent of those occurred either in the common room, bedroom or the cooking area. Next slide, please. So we also wanted to investigate some of the fires that occurred in common areas.

So those fires that occurred in interior stairs or ramps and those that occurred in hallway corridors. And we wanted to identify, well, what were the consequences of such fires? And we found that over those types of fires for that occurred either in an interior stair or a ramp, zero civilian deaths occurred.

We had six firefighter injuries and 164 of 179 fires occurred in buildings that were one to three stories. Similarly, for the corridors, fires in the hallway corridors. We saw zero civilian deaths, 11 firefighter injuries and 188 of the 244 fires occurred in buildings that were one to three stories.

Next slide, please. So when we look at the number of civilian fatalities and multifamily housing, you can see a scan, a similar trend that most of them are occurring in buildings that are three floors or less and non-sprinkler. And so this graph shows that in red, the non-sprinkler separated again, grouped by three floors, four to six floors or seven plus floors.

You can see the effect of sprinklers on the number of fatalities overall and how effective they are at reducing that. Next slide, please. We also want to see in the Minnesota data published a number of firefighter injuries in multifamily housing.

And you can see a very similar trend where most of the firefighter injuries occurred in non-sprinklers, non-sprinkler buildings that were up to three stories. And if it was sprinkler, we saw a reduced number of firefighter injuries where a building had a sprinkler system present. Thank you.

So we also want to look at the magnitude of events that occur. So if a fire starts, how many people are dying? So when we looked at the number of fires, we found that nine thousand six hundred ninety four or almost ninety nine percent of the fires resulted in zero civilian deaths.

But if we looked at the where the events where a single civilian death occurred, we found that approximately eighty four of those events had did not have sprinklers, whereas 16 of them did. And then as soon as you start going to an event where two civilians died or three civilians or five or six, those buildings were not sprinkled. Next slide, please.

We also wanted to look at the magnitude of the firefighter injuries and how many of those fires resulted in zero, one, two, three or multiple firefighter deaths. And we found that ninety six point five percent of the fires in multifamily dwelling homes resulted in zero firefighter injuries. The most common number of injuries was one.

And again, in sprinkler buildings, you can see that's in gold and not sprinkler. It is in green. The majority of those injuries occurred in non sprinkler buildings and the magnitude of the events.

Most times that there was a fire, only one person or one firefighter was becoming injured. If any were were injured. Next slide, please.

Thank you. So we also want to see where civilians were dying. And so we are able to see based on the area where the civilian was in contact with the fire.

So that first column is that a civilian was local to the fire. The second column is they were in the building, but not local to the fire. The third is they were outside the building and the last column is undetermined.

And so you can see. Sorry. And in blue is sprinklered and is red.

It is not. And if a occupant was local to the fire, you can see that there's that's by far the highest number of civilian deaths. So and even with the sprinkler, that's a pretty high number, but it is mitigated.

So you see the sprinkler system does have an impact on mitigating the fire if it does occur in the area where the individual was present or local to where the fire occurred. But we're seeing that the predominant number of people, civilians that are dying are local to the fire. And I think that's a very important thought to keep in mind when we're looking at a building.

If it has one stair to stair is because we're we're not going to be able to guarantee protection of the individual who is local to where the fire starts. And, you know, our study will look into this, but the number of stairs probably will not help the person who is local to the fire. And then you can see in the second column where we have occupants that are perishing that were in the building, but not local to the fire.

As soon as you add a sprinkler system into that building, the number of deaths drops significantly. Excuse me. And it's probably on the order of 10 to 15 that we found occurred in sprinkler buildings that were outside of the area where the fire occurred.

Next slide. So what has the data told us? We know that there is a difference in risk between one and two family homes and in multifamily structures, and that society inherently has accepted this risk.

And we've used that then as the basis for our benchmark to use that the benchmark as a multifamily structure rather than a one to family home. We've also found that most fires start in the kitchen, but that the living room and bedroom fires result in more civilian fatalities per event. And so when we do our fire modeling studies, we want to make sure we capture both of those.

We found how we have found that sprinklers are very effective at reducing civilian fatalities and firefighter injuries. And that if a sprinkler system is present, the number of events with multiple civilian fatalities or multiple firefighter injuries drops. Fires in the means of egress, those were the corridors and stairwells.

We haven't found that they've resulted in civilian deaths. And I think that's very critical for our study when we're looking at modeling and considering where we model these fires, that we do want to model a fire in a common area to understand what the impact is. But so far, the data has not shown that civilians are dying from those types of fires.

And then lastly, we want to show that civilian fatalities occurring outside of the area of the fire origin are rare in sprinkler buildings, and that most of the fatalities that occur are local to where the fire starts. Before I dive into the equipment reliability, I just want to pause and see if people have any questions or thoughts on some of that data.

[Speaker 10] (41:38 - 41:48)
I think Erickson Housing First, were you able to look at the year or any data on the year the building was constructed? Obviously, the sprinkler is an indication of that, but I was just curious.

[Speaker 1] (41:48 - 42:00)
Yeah, that was not part of the study. Sorry, that was not in the data that was available to us. And I would love to have had that data because I think it would add a really valuable point, but we were not able to map that.

[Speaker 4] (42:02 - 42:12)
Sorry, Stephen Smith coming remotely. When people die in area local to the fire, do you know how area local to the fire is defined? Like, is it the unit?

Is it the room? Is it the floor?

[Speaker 1] (42:14 - 42:20)
Yeah, that's a good question. I would say it is they could see the fire in the room where they were located.

[Speaker 4] (42:22 - 42:23)
Thank you.

[Speaker 1] (42:30 - 54:37)
Okay, Kyle Christensen again. So I wanted to then dive into some of the equipment reliability and look at some of the data that we collected on these systems. So we had a tiered approach for how we were going about to collect this data.

And from left to right is our, I would say, least desirable is on the left and most desirable is on the right. Where if we didn't have any data, we would rely on using some engineering judgment. But if we were able to find some correlations in international papers, we would have to evaluate how applicable that would be to our study.

Preferably, we'd be looking at data in the U.S., so we would look at all types of buildings in the U.S. and then see if those systems were applicable to our study or not. If it was residential, that adds another kind of good filter that is more applicable to our study since we are looking at residential buildings. If it was a multifamily housing building that was national, that was even better.

And then I would say the most accurate data that we could get would be from Minnesota multifamily housing, as that is the type of building that we are evaluating in our study. So when we look at some of the sprinkler reliability, we wanted to benchmark national data against Minnesota data. So the National Fire Sprinkler Association provided us some national data.

The Minnesota State Fire Marshal's Office provided us some sprinkler data for sprinkler activation. And we wanted to compare if a sprinkler system was effective. And so we wanted to see, did it operate effectively or did it not operate at all?

Was it too small to operate or did it fail to operate? And so we defined success as that operated and effective. If the fire was too small to operate, we didn't factor that into our calculation.

We also looked to see as the failure, we counted the two categories as operated and not effective. And then it failed to operate. Not every fire event had a sprinkler classification.

So we only took the data that was available to us and those categorized that was provided to us. So this next slide shows the distribution of that data on the national level. And so this is looking at the 5%, 50%, and 95% reliability of the sprinkler system on a national level in the form of a beta distribution.

And so you can see that it's a pretty tight window. If you saw a very large curve, you would have a very large uncertainty with your data. But when you have a nice tight grouping like this, you know that within 90% confidence that the sprinkler system will operate between 79.5% and 83.4% of the time. And so that means it has achieved its objective from the national data pool. The next slide looks at the Minnesota data. And so you can see that it's actually a little higher that the mean on the previous national data was 81.5%. The Minnesota data is around 87.1%. So you're starting to see a little bit of a higher reliability for the sprinkler systems in Minnesota, which is great to see. Now, we don't know, to Nick, your point, we don't know if these are newer buildings. So it's hard to draw maybe a direct correlation. But we are seeing that trend that it is a little higher.

And so we will use this in our analysis moving forward because we have a Minnesota specific data set. Next slide, please. We also did the same study for smoke detection.

So we looked at national and Minnesota data from the National Fire Sprinkler Association. And we found smoke detectors that either operated successfully or they failed to operate. And those were our success and failure, respectively.

And so we developed beta distributions for them as well, which are on the next slide. And there are a ton of data available. So you can see how tight that the 5% and 95% window are.

So we have a very high degree of confidence that is between 86.1% or 87.2% that the smoke detector does work. And this is a local smoke detector. This is not a building smoke detection or building fire alarm system.

Next slide, please. So again, you can see the Minnesota data is a little bit of a wider curve. But that's just because it has a smaller data set.

But again, you can see it's a little slightly higher. The 86.6% was the national data at 50% reliability. For the Minnesota, it's 87.2%. So again, not a big difference. But again, trending a little bit higher. So again, that would be the data that we would use in our study moving forward, because it is specific to the state of Minnesota. Next slide, please.

We looked at some door closer reliability data. We were not able to find a lot domestically on this. But we did find that a gentleman named Kevin Frank in New Zealand conducted a study where he put devices in different types of residential buildings and put them in the exit stair for 180 days in 52 doors.

And essentially, this device looked at how much the door was opened, if it was open an inch or if it was fully open as a function of time. And so in apartment buildings, he looked at two apartment buildings and he put devices in five of the exit stair doors. And note that these are not the dwelling unit doors.

It's just the stair doors. And he found that on average that the doors in apartments and condos were in the closed position on average 86% of the time. So you can see that for the most part, those exit stair doors are closed, but there is an appreciable amount of time where they are not.

Most likely people moving in, they're propping the door open, or they could just be holding it open. It could have been propped open by accident. The door closer could have been broken.

But when we're going back to our flow chart, this is international data, but this is really all we've been able to find so far on the study that's been done on how often a door is open. Next slide, please. So this shows the door reliability for all sleeping occupancies.

So he looked at nursing homes. He looked at apartment buildings. So there are a number of different types of residential buildings that he looked at.

And this is the probability that it was open. So you can see the mean is .104. So that's about 10% of the time they found that those doors were open. We would probably look to use the apartment building data because it's more indicative of what our residents would be for our single-stair building.

So that's, barring any further data that we would find, something that we would consider using for our study. Next slide, please. So I've talked a lot about data and means and all that, so I wanted to maybe discuss a little bit about where that all is being used.

So when we were here in April, I showed an event tree, which shows the different states of the mitigating systems and how they affect the building response. So for our study, we are assuming that ignition occurs. We're not looking at the frequency of the fire occurring in the kitchen versus in the bedroom.

So it's a conditional that the fire has occurred. And so now we step through the different mitigating systems, which are indicated on the rows going above between detection and alarm and automatic suppression, and you assign a probability of success and a probability of failure to each of those mitigating systems. And so any of the complementing probabilities should sum to 1.0. So the 0.87, the 0.13. The up branch means that there's been a success. The down branch means that there has been a failure. So in the local detection and alarm, the success is 87% of the time. The failure is at 13% of the time.

And so what we're going to use this for is to look at different sequences and combinations of mitigating systems that fail. And so we can propagate those probabilities to reach different end states. So that first yes is that the automatic suppression system has failed.

The building alarm system is successful. The dwelling door has not closed, but the stair door is closed. So we're looking at a situation where the sprinkler has not actuated.

Let's say the fire occurred in the dwelling, and for some reason that door in the dwelling was open. Now the fire products can spread from the apartment where it originated into the corridor, potentially compromising the ability for other people on that corridor to evacuate. And then same thing with the stair door being closed.

If that stair door is open, now you've compromised potentially the single stair. And so how does that affect the ability for people to egress the building? And so when we're looking at these different probabilities, this is kind of the handoff between what I'm doing and what Nick will be doing with the modeling, is that I will be giving him different combinations of mitigating systems that have failed, such as the doors, and he will model the fire occurring in a location in the building, and then is that door open or closed, or is the stair door open or closed, so we can see what the impact is on the building response. And then I can then calculate what is the likelihood of such arrangement occurring.

Next slide, please. So we do need to acknowledge that in a perfect world we would have data for all of this information, but right now we've only seen real comprehensive data for sprinkler systems and the local smoke alarms. So some of the data that we're still hunting down, you can see this list here, that we would love to be able to incorporate into our event tree, but may not be able to, or we need to assign some kind of engineering judgment to it, are listed here.

I think some of the big ones to note are the dwelling door position, because that has a large impact on whether the combustion products can affect multiple people in the building. Also inspection, testing, and maintenance, we were just talking about this earlier, that we would love to see some data on that to see what those reports are turning up. So that can help us inform what our judgment would assign some of the success of the different systems.

Next slide, please. So what are some of the takeaways that we found? We did a comprehensive study of international and domestic data across all types of residential buildings, but really focusing on multifamily where it was available.

We are finding that Minnesota is trending above the national averages in both sprinkler and detector systems, and we will use that in our calculation for that event tree because it's both reliable data and it's more specific to the types of the area where we're doing this study. We have found that there's a large difference in what data is available. Like we said, local smoke alarm and sprinklers have a large amount of data available.

All the other mitigating systems, we haven't been as successful to find those yet. So that's something that we're still actively looking at. But I do want to note that I do believe we do have adequate data to perform the comparative risk analysis, because if we do make an engineering judgment on a specific type of system, that will be propagated in both our control building code compliant building and also in our test building.

So those effects will be carried on both sides. So we don't believe that just because we have to make an engineering judgment that our data will be compromised. Before I hand it to Nick, I want to pause for questions on that.

[Speaker 3] (54:39 - 55:57)
I think this is a really good time to pause for just a minute because there's a lot of data out here. This is the basis of this study. So first of all, I want everybody to be clear with the data that we're looking at, because Nick summarized the data we're looking at.

We're not looking at everything under the sun. We're looking at what he talked about today. There are numbers that are associated with success rates of systems that are in place.

They're expressed as percentages, but they come into decimals, right? There are numbers that get associated with failure. And then mathematically, those end up getting combined into those risk trees that we talked about.

This is the basis of this risk analysis study. So I just want to be sure that everybody is really clear on how this data is being used and that we do apparently have enough data to be able to do this analysis effectively and with confidence. Does anybody have any questions regarding the data or how we're looking at the data or using the data?

[Speaker 6] (55:58 - 56:07)
Kyle, do you know the fires originated in the sleeping units or living rooms? Were those attributed to smoking predominantly or not?

[Speaker 1] (56:07 - 56:16)
That's a good question. I believe the answer is yes. I could break that down.

I could look at that. But I believe the answer is yes.

[Speaker 17] (56:17 - 56:25)
Nathan Broome, City of St. Paul. When you say multifamily dwellings or multifamily units, were townhomes included in that data?

[Speaker 3] (56:26 - 56:37)
Amanda, do you know the answer to that? I don't remember off the top of my head. I would say no, because a townhouse is typically a single-family attached unit.

Thank you.

[Speaker 7] (56:39 - 56:53)
Melissa Rodriguez, when you're talking about ITM, have you considered reaching out to any of the companies that offer software service trade? I know there's at least one more to see if they have statistics on kind of the results of the ITM that are being gathered with their software.

[Speaker 1] (56:54 - 57:08)

Yeah, that's a good question. We have not reached out to those yet. We've been focusing to see if there's anything that the Minnesota inspections have turned up.

But I think that would be a nice complement to that data, again, to baseline what we find. So I will add that to my list.

[Speaker 7] (57:09 - 57:16)
I might have a contact at service trade, but I want to say there's at least one other software company out there for ITM stuff. Okay, I will add that to my list.

[Speaker 2] (57:16 - 57:22)
Thank you. Do you suppose that would be available to us? Would companies be willing to share that with us?

[Speaker 7] (57:22 - 57:32)
I don't know. I mean, it's something to kind of maybe ask them first, because if it can be made anonymous somehow or just more statistics than anything else.

[Speaker 2] (57:33 - 57:41)
Insurance companies have a lot of that data from their inspections. They don't want to share it. They don't want to share it.

They view it as a competitive advantage.

[Speaker 15] (57:42 - 57:42)
Yeah.

[Speaker 4] (57:46 - 58:25)
Steven Smith, I have two questions. Number one, the success rate for the automatic suppression, I think it was 87%. Is that per device?

Is it per room? Is it building-wide? And then the second question was just in general, you know, when you found these various failure success rates, was it not the exact numbers, but the data you found?

Was it about what you were expecting to find, like, you know, just the availability of the data and the research? Or was it more than you expected to find less? Like, I just mean the breadth of research available.

How did it match the expectations of what you were looking at? How much you were going to find?

[Speaker 1] (58:26 - 59:28)
Yeah, for the first question, with the reliability of the sprinkler system, that's on a building level did the sprinkler system operate as designed. So, yeah, that's on the building. Any portion of failure in the system, whether there was a valve closed or if the sprinkler wasn't able to control the fire, it looked at that comprehensively from a building perspective.

For benchmarking the data, this compared pretty well overall, I would say, with the national trends that I would expect to see. I would expect this data to trend as buildings are newer. I

would expect this data to be trending up just because some legacy systems are maybe not as reliable.

We've had lessons learned in the industry to make systems better, especially with the supervision of certain valves in the sprinkler system to guarantee that if the sprinkler needs to flow, that it will flow. So I think it does compare well with what I expected to see. Yes.

[Speaker 5] (59:31 - 1:00:37)
Tom. A couple of questions. One, in your data, I agreed with you that careless smoking may well be the primary cause in the common area or bedroom, as you described.

I don't know that candles might be worth looking as well. My understanding is the data from candle fires is going up. Number two, I don't see anywhere in the data any kind of, and there may well not be any way to do it, but the human behavior factor of people running into the wrong room, running into a closet, running into the bathroom, whatever, whatever, on some of these fire deaths, people making what they thought was a rational decision at the time, which proven that it's not.

But is there any way to get at the human response to this?

[Speaker 1] (1:00:38 - 1:01:19)
So, yeah, the human response factor, I believe the data that Amanda sent over had some of that in there, but it was pretty sparse, and it's very subjective. And so it's been difficult to draw a concrete conclusion. So I think what we would look at is how do we capture that in some of the modeling response and look at generically how do humans react to a fire?

Because when Nick does his modeling, he'll be looking at that delay, the stress levels of the situation that the occupants are in. And so we're hoping to capture that aspect in that modeling piece. But in terms of the data we received, there was not enough to draw any conclusions from that.

[Speaker 2] (1:01:19 - 1:01:57)
And this is Nick Ozog. From the modeling standpoint, we can look at various human behavior aspects. They will be on both sides of the equation, whether it's a two-exit building that's allowed today or the model single exit.

So any errors within or perceived errors within that human behavior will be on both sides. And we're trying to focus or limit our study on what aspects are in the code today and what variables are written in the code. And that doesn't always include human behavior aspects.

[Speaker 7] (1:01:58 - 1:02:46)
Melissa Rodriguez, I have another kind of question related to the human behavior as far as if you're considering. And honestly, it was just because I attended a presentation on alarm devices last week. The instance of humans disabling their alarms because of nuisance alarms from, you know, burning their food.

The interesting part of the presentation that I went to was there are new test standards that are supposed to show that a detector won't detect or won't alarm if it's just burnt food versus an actual fire. Because if it keeps going off, then they're going to eventually just take

batteries out and stick it in a drawer. So as far as reliability of when the detectors operated or did not operate, I'm wondering at what, you know, what percentage is because they actually just disabled them themselves.

[Speaker 1] (1:02:47 - 1:03:02)
I think there's some national data from that. Sorry, this is Kyle Christensen, National Fire Protection Association data that looked into if a sprinkler fault, or sorry, if a detector faulted, why did it? Was there a power failure?

Was it turned off? So I can look into that, but I believe that data is present.

[Speaker 7] (1:03:03 - 1:03:21)
The results of the study that has been done by NIST, it was literally an hour of data from NIST. But it was actually very fascinating to find out, like, what impact, you know, kitchen hood systems, distances, even having a detector in a kitchen or not. And they didn't recommend detectors in the kitchen, which I always found interesting.

[Speaker 9] (1:03:24 - 1:03:31)
Patrick Ferens, was there any, like, 13, verse 13D, verse 13R in that study, or was it just sprinkler?

[Speaker 1] (1:03:31 - 1:03:43)
Kyle Christensen, it just said sprinkler present or not present. It did not break it down. Where we are leading right now is to have an NFPA 13 system in the building, but haven't drawn any conclusions yet.

[Speaker 5] (1:03:48 - 1:04:45)
Tom Brace, at the risk of being overly defensive, some of the data that I've looked at has talked about two-thirds of the failures of sprinkler systems are when people turned them off or disabled them. They were not functional as designed. And I think, to be fair, that may well not be characterized as a failure.

I mean, at least in my evaluation, that yes, it didn't work, but there was not a design reason that it didn't work. It didn't work because somebody physically turned it off. And I don't know how you deal with that issue, but it's to Melissa's argument about people that deliberately disable a smoke detector.

There have been enough fire scenes in my life to see disabled smoke detectors.

[Speaker 1] (1:04:46 - 1:05:44)
Well, and so when we're looking at our objective of the event tree, we're saying, did it meet its objective? But we can separate that into, did the fire flow and fail to meet its objective, or did it not flow and then fail to meet its objective? And so what we're looking to do is be able to separate from a risk standpoint, what is the major driver?

Is it because the sprinkler system wasn't able to flow, or was it that it flowed and didn't work? And so once you start seeing where the drivers are, you can start focusing your attention on, well, to mitigate the risk, let's focus on that one where two-thirds of those failures are occurring. How do we either better supervise those valves?

And again, this could be more of a trend with residential buildings. Maybe people have a higher tendency of closing valves in that versus an office building, for example. So that's something I think we want to be able to separate in the data to show what is driving the risk.

Is it the sprinkler was flowing and not working or not achieving its objective, or was it not able to flow?

[Speaker 3] (1:05:46 - 1:06:38)
I think the building code either doesn't address or already has built-in factors for human behavior. And I guess from the point of the study, if we include those incidences when human behavior has taken somebody to actually close a valve, whether they did it intentionally or not, and we deep that as a failure, that allows for a more conservative view of what the risk analysis is going to be. And I'd rather not take that out because we're not going to be able to govern human behavior through the code.

So whoever is turning off the fire sprinkler system, we want to factor that in because we're not going to be able to prevent them from doing that. Just my opinion.

[Speaker 7] (1:06:38 - 1:06:39)
It's a different battle to fight.

[Speaker 3] (1:06:39 - 1:20:27)
It's a different battle to fight. Yes. Thank you, Melissa.

Any other questions? I think this next section with model floor plans is going to be a more robust dialogue with more questions. So I think we want to go into this really fresh.

So why don't we take a 10 minute break until 20 after 10? People can recharge their beverages and do what they need to do to be comfortable for this next section. We'll be back up at 1020.

All right. Thank you all. We have a Minnesota 1020, which is actually 1022.

So welcome back to the technical advisory group for single exit stairways. We will resume our discussion about model floor plans. So this is the part where we're first going to discuss what's allowable by code.

And then and we're going to determine which ones we want to use as our baseline. And then we will go forward from there and discuss what we actually want modeled as part of this fire study. So I will turn it over to Nick.

[Speaker 2] (1:20:28 - 1:31:36)
Nick Ozog. Next slide, please. Just a quick recap that Kyle was talking about.

No building can ever be considered risk free or 100 percent safe. Using this risk informed approach allows us to look at the data, fuel loading, system efficiencies and reliability data, which we're going to incorporate into the model. Some of these aspects.

Any discussion that we have will end up on both sides of the evaluation on what is code allowed and what we want to study for that single staircase, which helps our job a little bit, knowing that we only have finite resources. We do need to get a consensus today, ideally on the floor plans we're going to look at and model. So I am not showing any results today because we don't have any results today.

And then we'll continue to listen and learn from all of you. Next slide, please. This is some data that we showed last time.

It's our understanding and talking with various tech members that this should be updated towards the end of this month, early next month. So hopefully when that data becomes available on unit sizing and percentage breakout, this basically goes to some of the tag discussions that we had where there is a desire for flexibility in unit sizing within these buildings on these smaller lots. Again, not necessarily directly part of our study on why, but there's a desire for different unit sizing.

The reason we bring this up is it does impact some of the decisions that we're going to have to make, such as number of dwelling units on a floor is for the right number to limit things to. Don't have a conclusion on that. Want to hear from you.

But we'll propose something that was a combination of everything that we were either able to study, obtain through various sources that tech members gave or direct interviews with tech members. Next slide, please. Again, this is just a comparison to recenter kind of what we're looking at.

Kind of a typical two exits, their building double loaded corridor versus a single stair building, perhaps on a smaller area, perhaps not, but a smaller building in terms of area size. And whether that is the corridor layout here or something different, just kind of want to recenter why we're all here today. Next slide, please.

With this. Thank many of the tech members, specifically urban works on this. But we looked at a lot of different floor plans that are allowed by code with two, primarily two exits in this case.

But you can see a variation in building size, design, some maximize travel distance, some maximize that and corridors with stair placement. Others maximize common path of travel considerations. Some maximize all three of those all by code, all various designs and layouts of floor plans.

Currently, if you have two exits, the code does not prescribe how many units are on the floor or what those unit breakout is in terms of number of bedrooms or designs. Just things to consider as we move forward with our study and looking at what kind of floor model floor plans we should look at. Next slide.

This is a potential allowed by code floor plan design. Pretty large, over 40,000 square feet per floor. Travel distance is allowed, but maximize common path.

The travel is allowed, but maximize that distance at the end of a corridor is allowed, but maximize. There is no limit on the number of units and there's no and it allows for different

unit sizes to be done. Since this task group was then the legislative was not tasked with looking at number of stories, but a building height aspect.

Unfortunately, from a modeling standpoint, we do need to figure out a number of stories. In talking with various tag numbers and looking at how stories could be designed, different construction types, structural elements. Potentially eight stories could fit within a 75 foot building height limit.

And so later on, whatever we come up with, with the number of stories will be benchmarked with. This is layout one kind of maximizing the allowable code for two exits. There's whether it's the eight stories is what we've heard from various members.

It's possible within 75 feet of building height. If that's what the tag wants to model, that's what we can do. If it's something else, we'll get to those decisions later.

But this is the 1st floor plan that we propose to model. The 2nd is what's also allowed today with a single exit building. Next slide.

Sorry. It is a 4000 square foot floor plan, 3 stories travel distance. Of 125, 125 feet.

We did look at some variations, but you could have a corridor of 35 feet. And then limit the number of units to 4. We did.

Part of the reason for this design is just to anecdotally show that you could have different building for layouts based on the floor layouts that we were able to analyze from others. You could fit that unit sizing to studios or 1 bedroom and 2, 3 bedroom in this space. If that was a desire.

But this would be the 2nd case that floor plan that we would model because it's allowed. So it's the benchmark. So the 1st ID 1 is benchmarking it with 2 exit stairs.

ID 2 would be benchmarking with allowed with a single exit. And next slide. These are some of the variables discussed in the various tag and some of the research and some of the other jurisdictions that allow single exit buildings to various heights, including internationally.

What's in bold are effective items from a modeling standpoint that we can vary compare items to directly. That may have an impact on the consequences, excluding some mitigation items, which could come up in any recommendations that we have. But from a tag perspective, these are the items in bold are things that were generally discussed throughout.

We are not proposing to push construction type changes. So anything that's in the code for height and area today would be followed with any single exit building. That's why we, for example, didn't don't feel that modeling construction type.

Is is necessary at this time. We haven't heard of desire to go higher with a different type of construction. So anything in the building code today would still be followed.

So these are the 5 we've heard a lot about elevator. How we would potentially model that is it not as a means of egress, but it could be part of any consideration and firefighter

operations. But more specifically, it could act as a flow path or leakage path for any smoke in a fire.

And that's how the modeling would incorporate it. And so with that. There's a lot in my view, a lot to discuss.

Oh, next slide. Please. Thank you.

There's a lot to discuss here, but it's a study. So let's do discuss these items. Let's figure out what we want to look at and how we want to model.

Yes, we may have presented a few things that kind of came from the various tag numbers. But now's the time to figure out now. Yes, we want to do this.

No, we don't as an opportunity to look at this. For example, this square footage. I'll start there.

Yes, it's 6000 on the slide. We've also heard from various tag numbers with the various floor plans that if. If the desire is to have more than four dwelling units of various sizes in terms of number of bedrooms.

And and incorporate an elevator to do that floor plan logistically. You're looking at about 5000 square feet to make that work. But others have said, why stop at five?

Go a little bit bigger. Just putting something out there to study. Not advocating for any of these.

This is all based on what we've heard and what we've had an opportunity to look at. I'm going to stick on this one for a moment. I see some.

I'm sure there's questions or comments here. Here again, this is a study and an opportunity to get input from the tag group as a group, rather than individually. And the effectively, you can still think Kyle.

With a 6000 square foot floor plan, you could still meet 125 foot travel distance to a stair.

[Speaker 6] (1:31:41 - 1:32:45)
Nick, this is Jerry, I guess the 1 thing I struggle with. Not with this, but just basically single exit building. You also have the provision for single exit room or space.

And so what triggers a 2nd, exit on that for ours? 12 occupants, 125, 20, 20, 20. I'm sorry.

And then you have the corridor when a quarter needs to go in 2 directions. Except for data and limited 50 feet. So, I mean, is there.

Is there a square footage threshold? That sure you have 1 exit, but the room needs to the quarter needs 2 directions. You know, at what point do those is this intended to override the 2 exits from the space is intended to override the 2 means of direction within the rated quarter.

You know, or do we can say that as long as you're less than 50 feet, the maximum dead end for a 13 system that it doesn't matter what the occupant load of the quarter is.

[Speaker 2] (1:32:46 - 1:33:12)
So. We've talked about this internally and with various tag members. You can still build a.

You can have a 50 foot dead end corridor or reduce it to 35 feet as well with a 6000 square foot floor plan. But it does exceed the 6000. It does exceed the maximum allowable occupants for a single exit.

So it does make some changes there.

[Speaker 1] (1:33:13 - 1:33:54)
And I think I would just add, I think that's where some jurisdictions came up with the 4000 square foot limit is the occupant load is 200 square feet per person. So they said, okay, what's the maximum occupants we can put on a single floor? 400 or 4000 divided by 200 is 20.

So, I don't know where I think the advantage of the study is. We can see what is the impact if we go bigger? Like, do we have a queuing problem?

Okay, well, now we can maybe scale back and say 6000 square feet wouldn't be be good. So I think it's good to not limit ourselves from the modeling up front. Let's see what happens.

And then we can understand the results and make an informed decision about what's driving the risk in the building.

[Speaker 3] (1:33:55 - 1:34:51)
Greg, I guess I'm seeing that we have an opportunity to do a risk analysis and actually study what happens during a fire and what the impacts of different scenarios are on the situation. And, I mean, we know how code numbers come up in the ICC process. And sometimes they're politically driven and sometimes numbers are just numbers and they're carried forward over time.

We have an opportunity to sort of re-look at this in a different way. And see if going from, you know, 20 occupants to 25 occupants to 30 occupants has a significant impact on the risk of those living in those flood units.

[Speaker 4] (1:34:56 - 1:35:57)
Steven Smith, I have a comment about the number of stories. You know, the legislature asked up to 75 feet to be studied. My understanding of the intent was that was to align with the high-rise building code, the high-rise definition of the building code.

Otherwise, I'm not sure where 75 feet would have come from. So if it's the high, you know, if that's aligned with the way that height is measured through the high-rise definition, then I think eight stories is appropriate. But if we're interpreting 75 feet to mean 75 feet to the top of the building, not the top floor level, then you cannot fit eight stories in 75 feet.

I mean, 10 feet floor to floor is the absolute minimum. You can't go below that. You'd have ceilings that are, you know, probably below eight feet.

So that's my comment on the number of stories. If we're aligning with the high-rise height limit, then yes, eight stories. But if we're not, then it should be seven stories, in my opinion.

Thank you.

[Speaker 3] (1:35:57 - 1:36:07)
Craig Metz. The legislation says building height, so that's the number that we'd be looking at. Is the building height not the height to the highest occupant floor elevation?

[Speaker 4] (1:36:10 - 1:36:24)
Frankly, I sort of doubt that was the intent. Like, I don't understand where 75 feet would have come from. Like, we all know when you say 75 feet, that's the high-rise height limit.

That said, if that is the instruction, then it should not be eight stories. It should be seven stories. Thank you.

[Speaker 8] (1:36:24 - 1:36:41)
Thank you, Steve. Mary Burnett. I would second that.

If it's 75 feet to the top of the building, so in terms of sheathing, that would be, I would assume, seven stories, then, above grade. We'll need the 75-foot height instead. Well, thank you, Steve.

[Speaker 2] (1:36:46 - 1:36:52)
Well, I'm happy. This is Nick Ozog. I'm happy to check off one of the five items we were hoping to get.

[Speaker 3] (1:36:52 - 1:37:11)
Let's do a quick consensus. So, first item, are there any objections to modeling this building to seven stories? Hearing no objections, we have one down.

[Speaker 2] (1:37:11 - 1:38:22)
And then, for clarity, we will also model the two-exit building at seven stories as well. Going back to continue on with the square footage item. This, again, came out of looking at floor plans that provided discussions with various tech members and other research and other jurisdictions.

If there is a desire, and this is kind of tied into the number of dwelling units per floor. So, we can always have this discussion in parallel, floor plan and number of dwelling units that you'd like us to model. The eight units and 6,000 came from wanting flexibility, or us hearing that people wanted flexibility and allowance for that within a floor plan.

Knowing that it has significant considerations on what is currently in code with the number of people per one exit on a floor.

[Speaker 7] (1:38:30 - 1:38:42)
So, again, this is me being a little bit rusty about eagerness capacity. It's 20 people allowed for one exit, but is that based on just a residential code one exit? Does it matter the width?

[Speaker 1] (1:38:43 - 1:38:46)
It's the number of exits. The number of exits.

[Speaker 2] (1:38:46 - 1:38:56)
Okay. Irrespective of width. Yes.

Apparently, somebody has chosen that's a reasonable risk limit.

[Speaker 7] (1:38:56 - 1:38:59)
So, it's 20 per single exit?

[Speaker 2] (1:38:59 - 1:39:04)
But in an assembly space, you can have one room with 49 people.

[Speaker 14] (1:39:04 - 1:39:06)
Right, with one exit. One exit, but yes.

[Speaker 4] (1:39:07 - 1:39:44)
It's not 20 people per exit. It's 20 people from a space, and that section is really written for not residential spaces, because if you look at other things around the section, that would be interpreted as just a room. The 4,000 square foot limit that some other jurisdictions are considering, I was in the room on those, is sort of arbitrary.

It happens to align pretty well with the 20 people, but I don't remember what section that's in. But the 20 person limit, it's from a space, which is not very well defined, but if you look at the context around that section, it appears to mean a room, maybe an apartment, probably not a whole floor.

[Speaker 2] (1:39:44 - 1:39:49)
I've interpreted that in the past to apply to an apartment size, too.

[Speaker 7] (1:39:53 - 1:40:07)
So, this is Melissa. So, that's my only question. Is 6,000 square feet, 30 occupants per floor, if that's able to be done within code with a single exit stair, then I don't see why we wouldn't model it to that size.

Currently, it's not.

[Speaker 2] (1:40:09 - 1:40:10)
Currently, necessarily wouldn't be.

[Speaker 7] (1:40:10 - 1:40:20)
So, this would be something that would be part of the change of allowing a single exit stairs. You also will allow 6,000 square feet or 30 occupants per floor.

[Speaker 4] (1:40:22 - 1:40:22)
Right.

[Speaker 7] (1:40:22 - 1:40:23)
Okay.

[Speaker 4] (1:40:25 - 1:40:45)
Steven Smith, question about the stair width. Is 48 inches a proposal for specifically a model of a 6,000 square foot building, or would that also be the proposal to model a 4,000 square foot building? Secondary question, are we getting more than one model here, or do we have to pick 6,000 or 4,000 at the end of the day?

[Speaker 2] (1:40:46 - 1:41:14)
This is Nick Ozog. At this point in time, for us to start, we need to pick one for this example or this ID3 drawing plan. For the 48 inch stair, that's still open for discussion with the tag numbers, but it was proposed for a 6,000 square foot building.

If things change, it can be part of the variables that we look at.

[Speaker 3] (1:41:14 - 1:41:15)
Greg Metz.

[Speaker 4] (1:41:15 - 1:41:39)
Just to clarify, there are going to be 3 buildings modeled. 1 is going to be, or at least your proposal is a large 4,000 plus, 40,000 plus square foot, 2 square building, 2 stair building, excuse me. The 2nd is a 4,000 square foot building with a code minimum stair, which would be 36 inches.

And then the 3rd would be a 6,000 square foot single stair building with a 48 inch stair.

[Speaker 2] (1:41:41 - 1:42:04)
The 2nd, well, yes, 2 items, 1 and 2 are, this is Nick Ozog. First building modeled is code allowed 2 exit building. That would match the number of stories that model 3 looks at.

And model 2 is allowed single exit building today by code.

[Speaker 4] (1:42:05 - 1:42:11)
And so model 2 would be the, okay, the minimum stair, which, okay, I understand. Thank you. Sorry about that.

[Speaker 3] (1:42:11 - 1:43:41)
And Greg Metz, just to address the other part of the question. There was substantial discussion in the 1305 Technical Advisory Group regarding width of stairs. And there was a robust concern regarding firefighters moving up a stairway at the same time the occupants are moving down.

And a determination was made that the stairway width needed to be at a minimum 48 inches in width in order to accommodate two-way traffic. So that's where the 48 inches comes from. Anecdotally, when we're talking about number of units, I did a little research the other day.

When you're putting an elevator into a building, it looks like within the Minnesota business climate, you need about 30 dwelling units to be able to make that elevator economically viable in new construction. So if we're looking at a five-story building, we're looking at six

units per floor at a minimum in order to make the elevator economically viable. Otherwise, we're forcing developers to build higher.

And these are not hard numbers. This is just anecdotal.

[Speaker 5] (1:43:42 - 1:44:46)
Tom. Tom Brace. I understand the need to determine the parameters in what we do.

But I would like respectfully to ask that we have 48 hours to respond to some of these issues. I'd like to personally speak for myself. I'd like to talk to some key staff nationally about this.

I've heard as an example that we've talked about, and we're coming up on it, so I'll give you the—not to jump ahead too far, that the number of stories—I've heard three, I've heard four, I've heard six, and now we're introducing eight. So I'm wondering if we couldn't have our final response given 48 hours to answer.

[Speaker 3] (1:44:47 - 1:46:22)
Greg, I'll answer your question first. Nick has already mentioned that you're welcome to forward your comments from your representative group to him and you should have his contact information because you've had interviews up to this point. So if you want to provide supplemental information to that, that's fine.

We will not be reconvening this technical advisory group. The purpose of today's meeting is to develop a consensus for landing on where we're going with this. So we as staff could make an interpretation based on further comments.

It seems like the comments coming forward absolutely need to be addressed, but if there's a strong consensus from the group, it's in all likelihood we'll be moving forward with what this technical advisory group decides today. And with regards to eight stories, we already made a determination that it will be modeled at seven. The last piece I'd like to remind people is that what we're talking about is what we're going to study as a FHIR model.

This is going to be used to determine risk analysis for building higher. This is not rulemaking, and we will still have a separate technical advisory group to address specific rulemaking separate from this.

[Speaker 9] (1:46:27 - 1:46:39)
Dr. Kranz, with the increase in stair width, is there an impact to the corridor width or is that expected to just meet? I don't know what it would be in this layout, 36, 42, 48.

[Speaker 2] (1:46:42 - 1:46:56)
Great. Nick Ozog, great question, Patrick. We were proposing to follow the code minimum and not make changes, but we can, again, part of the discussion, the corridor width.

[Speaker 11] (1:46:58 - 1:47:08)
Tom Pitchnider, were we looking at the code minimum without the sprinkler option? Because you can go narrower with certain sprinkler options in your interior corridor.

[Speaker 2] (1:47:09 - 1:47:14)

Nick Ozog, we were planning to use sprinkler allowances.

[Speaker 8] (1:47:16 - 1:47:21)
Mary Burnett, would you also reduce the stair width on sprinkler allowances or not maintain 48?

[Speaker 3] (1:47:22 - 1:47:24)
Greg Metz, no. It would be 48.

[Speaker 12] (1:47:26 - 1:47:41)
Steve Kertek, can you just clarify where the 6,000 square foot came from? Was that just a number that you pulled out? It's a dead end slide.

I was just wondering if there was a reason behind it.

[Speaker 2] (1:47:41 - 1:48:55)
This is Nick Ozog. In the interest of science and engineering and architecture, and since this is a study, there was more thought put in than to the number. Part of the reason we're presenting all this as hand sketches is to give you an understanding, just a visualization, that this is all draft, part of the discussion.

Nothing's final. But in working with tag numbers, looking at the plans that we provided, as well as internally in our group, some of the architects, part of our team, to allow a flexibility in number and size of units, that's a desire of this tag on a floor, and include reasonably the corridor, a stair width of 48 inches, and an elevator. That seems, although not code required, seems to be desired from different aspects.

If you go above, say, five stories, to allow flexibility in the design, 6,000 was a reasonable to do that with eight units.

[Speaker 1] (1:48:55 - 1:49:13)
I think just to add, was that also complying with the common path of travel limitation? I think if you went bigger than that, the common path of travel was exceeded. So we used that as the governing area to say, how can we get people out within that distance, within the floor plate.

[Speaker 12] (1:49:14 - 1:49:17)
Steve Kertak, is an elevator required after five stories?

[Speaker 3] (1:49:18 - 1:49:20)
At five stories, yes.

[Speaker 4] (1:49:20 - 1:49:23)
There is no elevator requirement in the code.

[Speaker 10] (1:49:23 - 1:49:59)
I think there's some housing first. I spoke with a couple of folks in the apartment space to see what they're looking for from this, and just to echo what Kyle and Nick said, the flexibility, the more rigid these requirements become, the fewer options they are, and get to the point where the code essentially makes them unfeasible. So having the flexibility of up

to 6,000, just from an informer's standpoint, makes sense for the folks who are actually looking and building these.

[Speaker 3] (1:50:00 - 1:51:38)
Greg Metz, Stephen's correct that in order for an elevator to be required at five stories and up, you would have to have some sort of accessible amenity that would have to be at that level. Otherwise, you have to be significantly higher. I think it's, I forget, is it 12 stories?

Something like that. But at any rate, we're not, I mean, it would be above what this building would be allowed to be. So if there are no accessible or amenities that need to be accessible at those upper stories, we would only require a type A accessible unit in the building, and then type B units on that accessible level.

And if none of the other levels have any accessible elements on them, we would not require an elevator. From a practicality standpoint, a five-, six-, or seven-story walk-up probably isn't rentable at the lease rates that would be required to make the building marketable. So I think we're, you know, even if, I think a developer would struggle to rent a five-story or a unit on a fifth story in a building where it's a walk-up and no elevator.

So I guess I'm at, you know, elevator is on there as yes. I think our model needs to include an elevator and all the risks that come with including an elevator as part of the study.

[Speaker 7] (1:51:39 - 1:51:46)
Melissa Rodriguez, I was just going to say, I think we should keep the elevator. I wouldn't live on the fifth floor without one.

[Speaker 10] (1:51:47 - 1:52:12)
I think since I talked to some of our members, there's a five, our smaller department developers see a market for five without an elevator. They said they would do that, you know, test that more before going into six. But they say they do see, particularly in Minneapolis, where one developer says you can easily sell five.

[Speaker 3] (1:52:16 - 1:52:37)
Greg Metz, going back to the purpose of the discussion today is to develop a FIRE model. Including an elevator means that there's a higher risk in the building, so it's a more conservative look at what we're doing. So I guess I would like to include an elevator because it's a more conservative stance.

[Speaker 15] (1:52:38 - 1:52:45)
Agreed. I just, somebody has sent a chat and just said that can they repeat the elevator requirement?

[Speaker 3] (1:52:50 - 1:52:51)
Greg Metz, so.

[Speaker 15] (1:52:53 - 1:52:55)
Repeat what you said about the elevator.

[Speaker 3] (1:52:55 - 1:53:14)

We're talking about what we're going to use as the FIRE model, and I'm just going to ask the questions. Are there any objections to including an elevator in the FIRE model? I hear no objections, so we will include an elevator in the FIRE model.

[Speaker 15] (1:53:15 - 1:53:23)
And I have another question. Do you want attendees to be able to address this? No.

Okay.

[Speaker 13] (1:53:25 - 1:54:08)
Thank you. Going back to what Nick had said about the square footage and what the market, I think that is a consideration. I want to know what the risk is as that market is pushing the size or a driver in the size and know what that model looks like for the FIRE service or the risk for the residents.

And so as much as I initially was like bigger than 4,000, I think maybe it is a good way to go of looking at that bigger floor to see what that risk is and what the FIRE model is in that bigger square footage.

[Speaker 3] (1:54:10 - 1:55:09)
Greg Metz. I also know from discussions with legislators and some of the background behind this is they're looking for what has been termed sort of missing middle housing, and that's, you know, three and four bedroom apartments in the urban areas. And the thought was that with a single exit stairway format of a building, it more easily accommodates some of these larger apartment units.

And that was the desire and some of the impetus behind this. And I think granting a larger floor plate leads a little further forward and leans into that legislation. It seems like 6,000 square feet is, yes, it's pushing the edge, but it's not necessarily an unreasonable number when we're analyzing FIRE risk.

[Speaker 9] (1:55:12 - 1:55:41)
Patrick Ferens, you were increasing the occupant load per floor, which was directed to the exit capacity, right? So I'm going back to the corridor then. If you are then going to use the sprinkler exceptions to decrease the width of that corridor, it seems like we're probably causing some conflict there.

And I'm just curious how that would be addressed.

[Speaker 3] (1:55:43 - 1:56:19)
Craig Metz. I think we can, if we want to add additional parameters on this as part of the study model, which may include requiring that the corridors be modeled at 48 inches in width, we could certainly do that so it matches the width of the stairs. And that would be grounded in discussions from the Minnesota Rule 1305 group that thought that 48 inches was a minimum requirement to allow two-way traffic in a corridor for firefighters to move past.

[Speaker 9] (1:56:21 - 1:56:32)

Patrick Ferens, the tag for that 1305 group agreed 48 inches to get to the floor, but then there's still potential for two-way traffic in that corridor.

[Speaker 3] (1:56:33 - 1:56:36)
Thank you, Patrick. Mary, go ahead.

[Speaker 8] (1:56:36 - 1:57:00)
I just want to put out there the moment we're introducing an elevator means we then need to have an accessible route throughout that floor. So if all of our dwelling unit entries are on a 48-inch corridor, we're not going to have our accessible approach at all of those doors. We would need a 54-inch minimum to have a latch side or a pull for a hinge side approach to those dwelling unit doors.

[Speaker 6] (1:57:03 - 1:57:06)
This is Jerry. Can't they merely create an entrance?

[Speaker 8] (1:57:06 - 1:57:14)
You could create an entrance, yep. That's most likely what they would do. I'm just thinking if we're going to get into particulars, right?

[Speaker 3] (1:57:14 - 1:57:20)
Yeah, Mary, I think that's a good point, but I think that that's a detail that could be handled at the unit level.

[Speaker 8] (1:57:21 - 1:57:21)
Sure.

[Speaker 3] (1:57:22 - 1:57:41)
But it's a really good point. People still have to address that with 44-inch wide corridors, too. So, I don't know.

Let's go back to corridor width. It sounds like, Patrick, you're a proponent of moving to a 48-inch corridor.

[Speaker 9] (1:57:43 - 1:57:44)
There's some conflict there.

[Speaker 3] (1:57:44 - 1:57:50)
Okay, then I'll be a proponent for it, just for the purposes of discussion. Go ahead, Ryan.

[Speaker 14] (1:57:51 - 1:58:06)
So, Patrick, Ryan Rayne, just to address the sprinkler reduction for corridors, I'm not seeing that anywhere. Table 1020.2, minimum corridor width, is very specific and it's occupancy-driven, not sprinkler-driven.

[Speaker 2] (1:58:09 - 1:58:45)
This is Nick Ozog, as well. Part of the reason initially, I really appreciate this discussion. Part of the reason we left it off this first pass of things to affect the model is the corridor width would stay the same in the two-exit building and the single as a comparative analysis.

But hearing the discussion, as well, we're happy to bring it in and come up with an element to include in the model for a single exit.

[Speaker 3] (1:58:46 - 1:59:25)
Greg Metz. So, I have a hard time separating rulemaking from fire model, as well. And I think that this discussion is probably more appropriate for rulemaking rather than the model, because the 44-inch wide or 36-inch wide corridor is going to be sort of a riskier corridor, if you will.

And that's probably the one we want modeled. So, it doesn't necessarily mean it's the rule we're going to land with. It's what we're going to model.

And I think we want our models to be as consistent with what's currently allowed by code as we can.

[Speaker 4] (1:59:28 - 1:59:45)
Steven Smith, I second that. I assume an architect is going to go in and draw the actual things to be modeled in all of the details. And I would prefer to leave it up to them based on the other givens that we're discussing, the eight items or whatever it is.

Thank you, Steven.

[Speaker 6] (1:59:46 - 2:00:38)
This is Jerry. I agree, Greg. Greg, I have trouble separating the code from this, because if we're going to go off what the code currently allows, it's four dwelling units.

You know, it's not eight. And the square footage, the code really doesn't say. But if you max out east dwelling, it would be a pretty large building.

So, I think, and my concern is that if we go to the least restrictive, the minimum, then it tends to, and supposedly if the fire modeling supports it, then it tends to support that. No, eight dwelling units is fine. So, it should be fine for all buildings, period.

You know what I'm saying? And so, but I agree. I mean, just let the fire modeling show what it's going to show.

And hopefully rulemaking will allow us to put in safeguards that the industry feels are appropriate.

[Speaker 3] (2:00:38 - 2:00:39)
Thank you, Jerry.

[Speaker 6] (2:00:40 - 2:00:41)
Regardless of the modeling. Yeah.

[Speaker 3] (2:00:41 - 2:01:38)
Thank you, Jerry. I think from a practicality standpoint, I think the study is actually going to be a driver behind the rulemaking. And there are going to be some expectations with regards to following at least some of what is prescribed in the rulemaking.

So, to the extent that if it's possible to make it economically viable, so we're not sort of self-sabotaging the study by saying it can only be four units and it can only be 4,000 square feet. If we can entertain, or if the group is willing to entertain a little bit larger floor plate in order to be able to accommodate in maybe a few more units, so that it's actually economically viable to build a five-story building with an elevator, because that's kind of what people want. Maybe we can do that.

[Speaker 7] (2:01:47 - 2:02:27)
Melissa Rodriguez. So, it's kind of the last two that we're looking to agree on, the square footage and number of dwelling units, which are tied anyways. Yes.

I guess I'm fine with the 6,000 square feet. Like, as we kind of mentioned, it does sort of mean that the end rulemaking will have to allow more occupants for the single exit from the floor. But if that's, again, we're trying to be practical, and I think that this would be something to model.

And if we're showing that it's not, the model doesn't support that, it gives us a lot of valuable information. So, I'm personally fine with the 6,000 square feet and eight units for our model.

[Speaker 4] (2:02:31 - 2:02:44)
Stephen Smith. I'm happy with it for one of the models. I'm also happy that you're doing a more conservative one in case it shows that the more liberal one is not safe and the more conservative one is safe.

So, I'm happy with these three models.

[Speaker 3] (2:02:45 - 2:02:54)
Just as a point of clarification, correctness, Stephen, we're going to pick one that we're going to model. That's my understanding. Is that correct, Nick?

[Speaker 2] (2:02:56 - 2:03:16)
This is Nick. We are selecting, we have two benchmark models, one with a two exit, one with a single exit that is allowed today. And then the proposed third model that is on the screen right now.

[Speaker 7] (2:03:17 - 2:03:31)
Melissa, so your second model is a four unit short building. Yeah. So that's kind of the conservative one that I guess would satisfy.

Does that sound accurate? This is Nick, yes. And Stephen, I guess.

[Speaker 4] (2:03:32 - 2:03:50)
I'm sorry. So, just to clarify, my understanding was correct. There's going to be three models.

There's going to be a two stair one that complies with the current reasonable worst case scenario for two stairs. Then there's going to be two separate single stair models, one more conservative, one more liberal. Conservative one at 4,000 square feet, more liberal one at 6,000 square feet.

That's correct?

[Speaker 3] (2:03:51 - 2:04:01)
Greg, that is correct. The second model is also code compliant and currently limited to three stories in height.

[Speaker 4] (2:04:02 - 2:04:32)
Oh, it's three stories. Okay. I have, well, I'm a little worried then that, you know, the single stair at, you know, 6,000 square feet is not going to be safe.

But if you modeled it at 4,000, it would be safe. You know, I guess I'd love to see that 6,000 square feet is safe, but I'm a little worried that it's not and that there is an intermediate that would be safe that's not going to be studied. Is anyone else worried about that?

[Speaker 2] (2:04:36 - 2:05:17)
This is Nick Ozai. We're providing a risk-informed data information. We are not identifying if something is safe or not.

That is for others to determine. And, frankly, we don't know yet on where any of these will, any of the models, including the two that are code compliant today, will fall or where the results will be. That's why this is, why we think a very exciting kind of groundbreaking study that Minnesota is undertaking.

[Speaker 11] (2:05:21 - 2:05:58)
Tom Pichnetter again. I think what we're looking at doing is a good mix because, again, we get into study versus rulemaking. If we determine that a three-story per code is acceptable and where we're at is not, there's some medium in there that, through rulemaking, hopefully will decide what that number is.

Because we'll say X story of 6,000 square feet clearly isn't safe based on our study, but clearly 4,000 square feet of three-story is, where is that break after that? It's going to have to be a rulemaking, isn't it?

[Speaker 4] (2:05:59 - 2:06:05)
But that's a study to inform where the break is. This is the only study we're getting.

[Speaker 5] (2:06:12 - 2:07:11)
I just wanted to go on with what Tom was saying. It seems to me that one or more of those models will probably drive the rulemaking. I would submit that you don't have a lot of formal studies before you make rules on a general basis in your department.

So I'm anxious to see which one of the three will work or hunt or carry water or whatever analogy you want to make. But I really believe that the study is good. Whatever the results are, are going to drive your rulemaking.

You couldn't ignore what was found. Someone would, in the process, would want to make sure it was serviced. Thank you, Tom.

[Speaker 3] (2:07:12 - 2:08:16)

Which is why I'm going back. I think the 6,000 square foot makes it more palatable for our market. Does it increase the risk of the building because it's larger?

Yeah, it probably does. I guess I would like to see how much. And that's why I'm advocating for the 6,000 square feet, because I want to see if the risk is reasonable.

And like Kyle was saying earlier, we can't make a zero-risk building. We can't build a zero-risk building. So what is the differential between the two model buildings that are currently allowed by code and what is proposed in the rule?

And we've seen what the impact of is of having a robust sprinkler system and door closers and smoke detection and all of these other things that we do. Thank you.

[Speaker 4] (2:08:17 - 2:10:02)
Stephen Smith, so 6,000 square feet is much larger than the single-stair buildings that I typically see in Seattle. The average in Seattle, I would say, is a little over 2,000 square feet. In New York City, they're limited to 2,000 square feet.

In Europe, you typically see them – they're not limited by floor area, but on average, I would say they're, I don't know, between 2,000 and 3,000 square feet. So I would love it if we studied 6,000 square feet. It is determined that the risk level is equivalent or even less than the two current code-compliant buildings.

And great, we've learned that actually something more aggressive than is often built is – I understand that you're not determining whether it's safe. But the level of risk is acceptable. My concern, though, is that if it's not, then the rulemaking is left to try to determine what is an acceptable level of risk without it being modeled.

So what would be great if there were enough resources to actually do four models and to do a more conservative, taller single-stair building and then a more liberal, taller single-stair building. But if we're only getting one, I would actually prefer to limit the square footage to 4,000 than the number of dwelling units to, I don't know, five or six. It doesn't sound like I'm going to get consensus, so I'm not going to create a hung jury by insisting on it.

But as a proponent of it, that's my concern, is that I want to study – ultimately, I want to study the most aggressive thing that can get passed. But I don't – you've got to make a judgment call on what I think can be safe. And 6,000 square feet, it's a lot for a single-stair building in a global context.

That's larger than you typically see.

[Speaker 12] (2:10:06 - 2:10:51)
I guess – this is Steve Karatek. I'm a little confused now by what we're actually doing here. I thought we were trying to get a maximum amount of a building.

Now we're trying to decrease that amount. So I'm not sure. I thought the 6,000 seems like a good spot.

Now we want to go back down to 4,000 because the 6,000 might not work. But isn't the whole point of this is to do the 6,000 and see where the risk comes at, and then we decide if

we need to decrease the square footage? But if we want to go 4,000, I think that makes us all pretty happy, then let's do the 4,000.

I mean, do we get another model? It's definitely safer than 6,000. So let's just do the 4,000.

Go ahead, Carl.

[Speaker 2] (2:10:51 - 2:11:35)
Carl Balsara. I'm with Wisjany. I'm the project manager for this project.

Again, very excited about this project. What Minnesota's doing, nobody else has attempted to do. This is the right way to do it, a risk-based analysis.

We will commit to do another study if needed to get an acceptable design that can go to rulemaking. We will get you the answer you need. If we need to do another, if 6 is not acceptable, 6,000 is not acceptable, and 4,000 is, we'll do something else to find out what works.

[Speaker 1] (2:11:36 - 2:12:23)
So, Kyle Christiansen, what Carl is essentially saying is what's called a sensitivity study, where if you have a variable, and we chose 6,000 square feet, and now we change it to 5,000 square feet, what is the change in the risk? And so we can, I think we should go with the 6,000 square feet, and if that risk is, say, 10% higher than our most challenging floor plan, what if we reduce the floor plan to 5,000 square feet? We re-quantify.

How does that change in risk look like now? Maybe it is under the risk that we predicted with the code-compliant building. I think that's valuable information to then present for rulemaking, so you understand from a perspective what is driving the risk and how does that relate to what we quantify from a code-compliant building.

[Speaker 2] (2:12:24 - 2:14:05)
This is Nick Ozog as well, really quick. So with what Carl and Kyle just got into, kind of what's been going through my head during this whole conversation and even before we showed these slides is how they come up with this. Very specifically, and all the tag numbers, we appreciate all the input and all the data we've gotten.

In the interest of this is a study, we heard that 6,000 might be desirable. From a market standpoint, we've committed to looking at, say, 4,000 higher at a story, 7 we've now heard, too. But what is something that's desired?

Well, we want to give architects and designers flexibility, but also some confidence to the fire service and building officials that things are relatively within a comparable basis to what's allowed today by code. So I'd like to maybe recenter the conversation on is 6,000 a reasonable aspect from a market standpoint? Is eight units a reasonable number from a market standpoint?

Keeping in mind the square footage really limits the occupant load, and dwelling units maybe has an impact on how many kitchens there are. But nowhere else besides four in a single exit building today in the code do you see a limit on how many dwelling units.

[Speaker 10] (2:14:05 - 2:14:20)
It's an occupant load basis. This is Nick Erickson. And I think if you have it with a census study, I think I'm fine with keeping it as presented here, knowing that that's still there.

I think with the other, that's a different conversation.

[Speaker 4] (2:14:21 - 2:14:41)
Steven Smith, I agree that if there's going to be another, you know, if it's found to not have an acceptable level of risk, then redo it. I agree. That sounds great to me.

6,000 square feet, you do see it abroad. So it seems reasonable that it could be an acceptable level of risk. Based on what Carl said, I retract what I said.

I'm happy with 6,000 square feet.

[Speaker 8] (2:14:42 - 2:15:28)
This is Mary Barnett. I think the square footage, the stories, the unit count for some of the conversations is very marketable in the Minneapolis, St. Paul, even greater Minnesota area. Getting into that 50 to 60 units per building is what a lot of our developers are looking to get at.

It works with a lot of their pro formas, their finance models, no matter the funding source, bonds, tax credits, conventional financing, all of it, it would be, I think, a very big win for them to be able to do a building with a single exit stair and fill in some of that housing gap. I agree with the numbers being used.

[Speaker 6] (2:15:28 - 2:16:30)
Thank you, Mary. This is Jerry. Were your inputs clearly defined all the code parameters that are used within the modeling?

Because I just want to make sure that someone doesn't, in the end, look at this and say, yeah, I only want to do five stories where I can drop my type of construction. I can drop my sprinkler system. I can drop, I can do, I can possibly drop down my stair rating.

I can drop stuff that your modeling clearly shows that this is based on type 1, type 1A, 1B, type 2A, whatever clearly calls out so that there's no argument that no, if you don't want to max out the number of stories because you want to take advantage of lesser code requirements for a shorter building, but still use the provision that, obviously, from a rulemaking standpoint, we can come back and say, no, that's not apples to apples. This made the following assumptions of life of protection systems in the building.

[Speaker 2] (2:16:31 - 2:18:14)
This is Nick Ozog. So the modeling does not consider all the code requirements. It considers a fire in a specific location, smoke spread.

That's why we had the elevator discussion. That's an avenue for smoke spread. Then as far as the egress component to it, it considers different widths.

The construction that we're not proposing to look at, we haven't heard from any changes to change construction type based on number of stories than what's already allowed in the

code. So those items such as construction type, fire resistance ratings of various stair enclosures, corridor enclosures, it speaks more to robustness and practicality and less in terms of how the model is viewed. You're looking at smoke spread within the space that occurs before there's maybe any structural components to a fire or changes as a result.

And so all those items would follow the code, whatever number of stories you are. We are picking a maximum that we look at from a smoke spread egress standpoint, affecting a lot of people. And then any other changes such as we only want to allow a certain type of construction, we only want to allow a one-hour corridor, one or two hours there.

Those are all aspects in rulemaking if it's different than what is permitted in the code today.

[Speaker 18] (2:18:14 - 2:18:15)
Thank you.

[Speaker 8] (2:18:18 - 2:18:32)
Mary, can I just ask a clarifying question in how the modeling works? What I'm hearing is you don't prescribe like one-hour corridor, two-hour stair shafts. It doesn't necessarily take those pieces into effect like it's not.

[Speaker 2] (2:18:33 - 2:18:34)
This is not correct.

[Speaker 8] (2:18:34 - 2:18:34)
Okay.

[Speaker 3] (2:18:47 - 2:19:31)
Hearing a lot of quiet around the table. Are there any objections to moving forward with 6,000 square feet? We'll stop there.

6,000 square feet per floor plate for the fire study model. All right. Hearing no objections, we will go forward with that.

Are there any objections to proceeding with eight dwelling units per floor plate for the fire study model? Hearing no objections.

[Speaker 2] (2:19:31 - 2:20:26)
This is Nick. Nick Ozog. I asked a question to the tag group with the eight units.

I'm not trying to belabor anything. Hearing some of the information on what the unit count is to make some of these things viable, is that enough? And I'm not trying to push for a lot.

Our team, WJE Crux, is committed to doing a four-unit, 4,000-square-foot building at seven stories as part of the sensitivity analysis. If this shows, depending on what the results of this is, is there an aspect of eight units or the number of units on a floor? If, since 6,000 has been decided by the tag to model, does that need to be modified?

[Speaker 3] (2:20:36 - 2:22:24)

I'm going to piggyback and put Mary Bardot on the spot. But basically, type 3A construction, five stories in stick, very economically viable. At eight units per floor at five stories, that gives us 40 units.

Does that sound like it would be economically viable to build? Because you said 50 to 60 units for a project. Or are we forcing developers to go higher?

So essentially, we're pushing forward into type 2 construction to build higher in order to make it economically viable. To construct. So then we're talking about, if you're in for six, you're in for seven.

Because now you're building type 2, right? So that's going to follow the model. Or you could do five over two, using special provisions 510.

Yep. Just as a clarifier, so people know what we're talking about. So it could be, you know, five stories of stick, type 3A construction over a two-story type 1 podium.

Okay. Thank you, Mary. That would be at eight units per story, that would be 56 units.

That's in that sweet spot between 50 and 60 units.

[Speaker 11] (2:22:29 - 2:22:41)
That seems reasonable. Tom Pichner, just to clarify, so you're looking at dwelling units in the first two levels also? Yes.

And then changing your construction type? Yep. Okay.

[Speaker 9] (2:22:46 - 2:22:52)
Could there be mixed use then? I mean, you're not hitting a unit then.

[Speaker 8] (2:22:52 - 2:22:52)
Right.

[Speaker 9] (2:22:53 - 2:22:54)
And I don't know what code it would be.

[Speaker 8] (2:22:54 - 2:23:07)
Yeah, we talked about that a little bit. I mean, technically, right, you could put an A occupancy in those first two stories. But I think the point of this was to just do R2.

So we wouldn't introduce that here.

[Speaker 3] (2:23:08 - 2:23:29)
Yeah. And this is a study model, but if we're talking rulemaking, the code already says that for a single egress stairway in R2s, that that needs to be a dedicated stairway for egressing the R2s. So we need to probably carry that forward in rulemaking.

And the first two levels, if they weren't R2, they'd have to figure out another way to get out of the building.

[Speaker 9] (2:23:33 - 2:23:53)

Patrick Farris, to your question, Nick, I mean, are you asking, do we want to look at, now they want to do smaller units and they're adding units? Is that basically what you're... Yes.

Is this your hazard profile that probably switches with additional kitchens in addition?

[Speaker 1] (2:23:56 - 2:24:08)
When we're quantifying the risk, we're not looking at ignition frequency. So we're just assuming it happens. So that may not be reflected in the number of kitchens, but we're just assuming it happens.

Yep.

[Speaker 2] (2:24:17 - 2:24:43)
This is Nick. And the reason why we're specifically asking about the number of drawing units is there's been a significant commentary in our interviews with people about that number. No comment on if it's the correct or right, but just questions on the number of units as a limiting factor.

[Speaker 6] (2:24:49 - 2:25:10)
This is Jerry, just a qualifier. We're talking stories above grade plane and we intend to allow a basement. Because stories and stories above grade plane are two different things.

So I just want to qualify. We're talking stories above grade plane with allowance for a basement level that could have dwelling units in it.

[Speaker 3] (2:25:10 - 2:25:12)
That's what the code would allow today.

[Speaker 6] (2:25:12 - 2:25:13)
Yes.

[Speaker 3] (2:25:13 - 2:25:13)
Yes.

[Speaker 6] (2:25:13 - 2:25:15)
Okay, thank you.

[Speaker 4] (2:25:16 - 2:25:21)
Stephen Smith, the model is not going to include basement dwelling units though, correct?

[Speaker 2] (2:25:22 - 2:25:56)
This is Nick Ozog. The model would include total number of stories. And that's kind of where we came up with the original eight.

If there was a anecdotal garden unit, whether it's above grade or not, that lower level aspect, we need to understand the total number of levels. I'll say levels for the purpose of the modeling. The total number of levels to model.

[Speaker 3] (2:25:57 - 2:26:30)

Let's see. So in which case, do we want to take the question and go back to eight stories? So that we're seven.

Yeah, eight levels. So we're seven stories above grade plane and one story below grade plane. So in a garden.

Okay. No objections. Thank you, Jerry.

[Speaker 2] (2:26:31 - 2:26:45)
We talked about that. This is Nick. We talked about that a lot.

And thank you for that clarification, Jerry. As he probably explains, should have been eight levels, not necessary stories.

[Speaker 4] (2:26:48 - 2:27:00)
Stephen Smith, I think it was me who moved to put it down to seven stories because I didn't consider the basement thing. So given that, I mean, are we going back to eight stories? Sorry, excuse me.

Eight total levels?

[Speaker 3] (2:27:01 - 2:27:22)
Yes, sir. Eight total levels. That would be seven above grade plane and one below.

I'm fine with that. Okay. I think we have consensus across the variables that needed decisions.

[Speaker 2] (2:27:23 - 2:27:31)
This is Nick. Eight units. Do we agree on eight units or did we agree that ten?

[Speaker 3] (2:27:31 - 2:27:48)
I kind of lost track. Are there any objections to eight units? Is there anyone advocating for more than eight units?

We're at eight units.

[Speaker 2] (2:27:57 - 2:30:01)
This is Nick Ozog. Thank you very much. And then with a few minutes before we turn it over to Greg and others to wrap up.

Just kind of want to show and reiterate for next next two slides, please. We are for the modeling. We are assuming a fire starts.

The data has shown that sprinklers are very effective in reducing a lot of loss and injuries. But we are modeling sprinklers being ineffective. To address significant comments from members of the tag.

So in some aspects, that could be a couple of failure points already that we're modeling. But that will come out in the data risk consequence analysis that our team is presenting. Whereas the modeling aspect is a consequence on the consequence position.

We are looking at a dwelling unit fire with the door open. And then various positions of the stairs are essentially open or closed. And then a corridor fire.

We heard, although the data may not be leading us towards a common area corridor fire scenario as being lost significant from what we're seeing. We've heard strong comments to evaluate it, especially with some of the different modes of transportation that might be out there today and deliveries and whatnot. A corridor fire as well.

In this case, the dwelling unit door will be closed, but the stair doors will be open and closed in various positions just to get a sense for smoke spread and tenability throughout. And with that next any questions.

[Speaker 5] (2:30:09 - 2:30:15)
Explain again, why are you modeling it without the Sprinkler intervention?

[Speaker 1] (2:30:20 - 2:30:57)
For the purpose of this study, we really want to focus on those occupants that are outside of the area where the fire occurs. And the sprinkler system won't necessarily save those people inside of the dwelling unit where the fire occurred. So from quantifying, if we didn't want to find a sprinkler system where successful.

We are not. We're not seeing there's data that supports people outside of that area are are in danger. So we want to focus on the risk of the sprinkler system not activating.

And then how does that impact people outside of the dwelling unit where the fire occurred?

[Speaker 2] (2:30:58 - 2:32:43)
This is Nick goes on to further that we're evaluating the consequence part. And the data that Kyle presented earlier today shows that the. When the sprinkler system activates their minimal losses as a result.

And so we are trying to look at that bottom portion of the tree when things fail. Same with why we're looking at a fire starting or a fire has already started, not the frequency of a fire actually started for one having been started. Further.

Next slide. Next slide, please. And with that kind of our next steps.

Thank you very much for working with us on the floor plans. We're going to go back and start doing our modeling to figure out the consequence analysis. There's been some good comments brought up with maybe additional points to look for data that we as a team will look at.

We will show that kind of the fire scenarios using the event tree will put the consequence with the venture together. Look at that risk achievement work and provide the report should be alive. I know some numbers both us, but if you have additional input, additional thoughts on where we might be able to get data, please get it to us or reach out.

And with that, thank you very much.

[Speaker 3] (2:32:45 - 2:34:47)

I want to thank you, too. I want to thank the consultant team for all the work that went into preparing for the technical advisory group meeting today. Just to reiterate, this group has come to consensus that we will be looking at a fire study model that is seven stories in height plus a basement.

It will include six thousand square feet per floor plate. There will be not more than eight units. Well, the model will have eight units per story.

The stairway width will be a minimum of forty eight inches wide. The building will have an elevator. We're not modeling a specific construction type and we will be following the state building code for other items that were not specifically addressed.

In the model. Thank you very much for your time. This will conclude our meeting today.

I will send out an announcement sometime in early December when we will have our next technical advisory group meeting where we will go over the preliminary draft of the final study to present to you for any final comments that you may have. Again, as Nick mentioned earlier, if there are any follow up comments to this meeting today, please get them to him as soon as possible. If there's something that comes up, we can, as staff, we can deal with any comments that come in from the technical advisory group.

And if we have to make modifications, we will. Thank you again so much for your time today. I appreciate it very much.

This meeting is concluded. Thank you.