

**ALASKA STATE LEGISLATURE**  
**SENATE TRANSPORTATION STANDING COMMITTEE**

February 7, 2019

1:31 p.m.

**MEMBERS PRESENT**

Senator Shelley Hughes, Chair  
Senator Peter Micciche  
Senator Jesse Kiehl

**MEMBERS ABSENT**

Senator Mike Shower, Vice Chair  
Senator David Wilson

**COMMITTEE CALENDAR**

PRESENTATION(S): IMPACT OF EARTHQUAKE ON TRANSPORTATION

- HEARD

**PREVIOUS COMMITTEE ACTION**

No previous action to record

**WITNESS REGISTER**

DR. MICHAEL WEST, State Seismologist and Research Professor  
University of Alaska Fairbanks  
Fairbanks, Alaska

**POSITION STATEMENT:** Participated in the presentation, "Impact of Earthquake on Transportation."

DAVE KEMP, Central Regional Director  
Department of Transportation and Public Facilities (DOTPF)  
Anchorage, Alaska

**POSITION STATEMENT:** Participated in the presentation, "Impact of Earthquake on Transportation."

CHRIS HODGIN, Facilities Services Project Manager  
Department of Transportation and Public Facilities (DOTPF)  
Anchorage, Alaska

**POSITION STATEMENT:** Participated in the presentation, "Impact of Earthquake on Transportation."

RICH PRATT, Chief Bridge Engineer  
Department of Transportation and Public Facilities (DOTPF)  
Anchorage, Alaska

**POSITION STATEMENT:** Answered questions related to the presentation, "Impact of Earthquake on Transportation."

MARK DAVIS, Director  
Division of Facilities Services  
Department of Transportation and Public Facilities (DOTPF)  
Anchorage, Alaska

**POSITION STATEMENT:** Answered questions related to the presentation, "Impact of Earthquake on Transportation."

#### **ACTION NARRATIVE**

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**CHAIR SHELLEY HUGHES** called the Senate Transportation Standing Committee meeting to order at 1:31 p.m. Present at the call to order were Senators Kiehl, and Chair Hughes. Senator Micciche arrived soon thereafter.

#### **PRESENTATION(S): Impact of Earthquake on Transportation**

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CHAIR HUGHES stated that the only order of business would be a presentation on the November 30 earthquake, how it happened, how it was monitored, and how it impacted roads and public facilities. She invited Dr. West to begin his presentation.

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DR. MICHAEL WEST, State Seismologist and Research Professor, University of Alaska Fairbanks, Fairbanks, said he directs the Alaska Earthquake Center (AEC) that is most known for its rapid assessment of earthquakes and the basic parameters such as where they occur, how large it was, and the extent of the ground shaking. Anyone who has visited coastal communities has likely seen evacuation signs or signs that map the hazard zone for tsunamis. Those are installed on safe zones determined through research and products also put out by the Alaska Earthquake Center.

CHAIR HUGHES asked if the Alaska Earthquake Center puts out both the initial and the subsequent, more finely tuned, report following an earthquake that is available through a phone app.

DR. WEST replied, "those are a glimpse into our workings of what we do." He explained that when an earthquake begins, the recordings come in from a number of different locations and are put together for an initial assessment. As more data becomes available, AEC's assessment of the magnitude and location changes. He acknowledged that can sometimes cause consternation but that's because the information is disseminated so quickly. Information is generated through computer algorithms and it goes out within a couple of minutes, before it's been reviewed by a human. As an analyst goes through and adds and removes data it evolves. For larger earthquakes like the one on November 30, there can be some debate that can extend days or weeks after the earthquake. He said magnitude is the best assessment and it is dependent on the available data.

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SENATOR MICCICHE joined the committee.

CHAIR HUGHES asked if the last earthquake was magnitude 7.1 or 7.2.

DR. WEST replied there continues to be a vibrant discussion among agencies that worked on this earthquake about whether it was magnitude 7.0 and 7.1. And there's still a chance that assessment could be revised.

DR. WEST said a third take away from the earthquake center is the research to explain where and why different earthquakes happen. He displayed a map on slide 4 that shows the 55,000 seismic events in Alaska that were large enough to be reported in 2018. He said most of the events were very small, but they paint a picture. Some of the earthquakes were the usual suspects while others, like the January magnitude 7.5 earthquake off Kodiak, are not anticipated. When this happens, there is considerable research and analysis to put it in perspective and specifically figure out what it means for the future.

He explained that the data from the past few slides are used to develop building codes and the environmental review process for any major projects. They also help determine insurance rates, evacuation routes, and where shelters should be in coastal community. He advised that any community that has a hazard mitigation plan likely includes a seismic and/or tsunami component.

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DR. WEST directed attention to AS 14.40.075 to show that the legislature's directive sets the Alaska Earthquake Center's general direction and responsibility to report under the leadership of a state seismologist, a role he is currently filling. He related that he pointed this out because he hopes the legislature will view the earthquake center as a state resource.

He displayed a map that shows the network of about 150 monitoring stations throughout the state. He said AEC operates a majority of the stations, but they also have some partners in this activity. He explained that when a seismic event occurs, the recordings from each of the sites stream data live into the headquarters in Fairbanks where it is assimilated into an earthquake report. He displayed a slide depicting a typical seismic station with a power system, sensor in the ground, and a radio that communicates data back live. He noted that continuous communication is a technical challenge during winter on the North Slope, coastal storms, or in the Aleutians, but the engineering to keep things running is something AEC is most proud of.

DR. WEST related that he views the earthquake center as taking the pulse of Alaska, because anything that moves the ground in a significant way is reflected in the data that rolls through the center. He displayed an example of 40 minutes of the data that was recorded later in the morning of November 30. He explained that each of the lines is a station that recorded about 50 aftershocks in that brief snapshot of time. It is the foundation of what AEC does, he said.

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SENATOR MICCICHE asked why aftershocks are identified as such instead of either another earthquake or one continuous earthquake until things settle down.

DR. WEST clarified that an aftershock is no different than an ordinary earthquake. However, when a large earthquake happens, the earth has to adjust to the new position and that process breeds many more, but generally smaller, earthquakes. Because they're traceable back to the original earthquake, they are referred to as aftershocks.

SENATOR MICCICHE asked if aftershocks are ever a larger magnitude than the original event.

DR. WEST said yes. He advised that when an earthquake occurs there is always a small statistical chance that it would trigger a larger quake. Globally, the chance of that happening is one to five percent, although it varies depending on the location. "You have to look around and say, 'Well is there something reasonable that may be triggered by this.'"

CHAIR HUGHES noted that after she downloaded the earthquake application, she learned of a 7.0-7.2 magnitude quake in the South Pacific that was followed by 7.9 magnitude earthquake. She acknowledged that knowing that was a possibility made her more nervous.

DR. WEST stressed that even before the November 30 earthquake, AEC knew there was potential for something larger, whether triggered or not.

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SENATOR KIEHL asked who AEC partners with to monitor earthquake activity.

DR. WEST replied the Alaska Volcano Observatory has significant instrumentation in the Aleutians, the Alaska Tsunami Center has a handful of sites around the state, the U.S. Geological Survey has a couple of sensors, and the Canadians are close partners. He turned to slide 11 and noted that Alyeska is just one example of a group that uses the seismic data to prioritize where engineering resources and inspections should be focused and where there is little risk.

He said AEC has answered a lot of questions (like those that have come up today) over the last several weeks to try to put perspective on the November 30 earthquake. He noted that a recurring question has been whether that was a worse-case event. The answer is that it was a learning experience, but Alaska's history makes it clear that it was by no means a worse-case event. While statistically not common, the 1964 earthquake demonstrates the other kinds of earthquakes that are a possibility. The lesson, he said, is that the next earthquake will undoubtedly look different and be a surprise in some way.

CHAIR HUGHES asked him to talk about why the damage can be so great in one location, but there can be almost no damage in nearby locations. She pointed to slide 12 that depicts a section of highway that was extensively damaged yet a mile down that road there was almost no damage.

DR. WEST advised that zooming out on that picture would show miles of road that were minimally impacted. Soil factors in particular places led to different results. The experience was the same in different neighborhood where the soils and underlying geology is different and the response to an earthquake is different.

CHAIR HUGHES characterized it as the difference between a bowl of Jell-O and a bowl of ice cream. The shaking is the same, but the Jell-O will jiggle more.

DR. WEST added that this earthquake occurred 30 miles beneath the surface and while everywhere from Anchorage to Palmer to Wasilla to Willow experienced the same basic forces, the differences in impact was largely a result of the differences in geology.

He reported that another question that has come up a lot is whether there is the potential for this to occur elsewhere in the state. He said the historical record provides a good foundation to address the question. Southeast is certainly capable of earthquakes of this magnitude, but the majority occur out towards the coast. There is plenty of history for magnitude 7.0 earthquakes in the Interior, but they are less frequent than in South Central.

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DR. WEST turned to slide 14 that responds to Senator Micciche's earlier question about the distinction between an aftershock and other earthquakes. Based on the last two months of aftershocks, AEC anticipates that about a year from now the rate of aftershocks will be low enough that it will be hard to distinguish between an aftershock and the customary background earthquakes. He acknowledged that that projection can change.

He said Eagle River, Palmer, Wasilla, and Willow experienced roughly the same amount of shaking. But because Eagle River had disproportionately high damage compared to the other places, it was necessary to look at factors other than the earthquake itself.

SENATOR MICCICHE asked if there was white paper on earthquakes, and if there are earthquake categories that make Alaska more earthquake prone.

DR. WEST offered to provide resources after the hearing to help explain why Alaska is more earthquake prone.

CHAIR HUGHES noted that the presentation earlier today highlighted that some schools suffered significant damage while others had very light damage. The takeaway was that the soils and geology as well as how and when the structures were built are all factors. She, too, asked for follow-up information and any available research to help understand the variability in damage suffered in the November 30 earthquake and to be more prepared going forward.

DR. WEST responded that if there is a silver lining to an event like the November 30 earthquake, it is that it presents the opportunity to do that research. "We don't get a lot of chances to examine the societal impacts of an earthquake like this," he said. That earthquake generated tremendous interest nationally and internationally, particularly in the engineering world. A number of teams came in motivated by the desire to help assess which buildings were and were not safe and the opportunity to learn from the event. This is how building codes advance. He confirmed that significant research is ongoing, and the work will continue for years.

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DR. WEST turned to slide 17. It is a map of Alaska that shows the monitoring network through the state depicted by the scattered white triangles. A map of California is overlaid on Western Alaska that shows the highly concentrated instrumentation in that state. He said he likens it to the difference between doing astronomy with a Hubble Space Telescope versus a pair of binoculars. He said the next slide provides a concrete example. This brief introduction to the concept of earthquake early warning is an operational reality in Southern California and is in testing across the entire West Coast of the U.S. - Washington, Oregon, and California, he said. The basic premise is that if detection is early enough to warn ahead of the seismic waves, people will receive some advance notice.

CHAIR HUGHES asked him to clarify that in this instance, the western coast of the U.S. does not include Alaska.

DR. WEST confirmed that Alaska is not part of that system. He continued to say that he uses this as an example of the kind of federal initiative occurring in the nation that Alaska is not part of because of a lack of foundation on which to build such a thing.

CHAIR HUGHES pointed out that this is despite the fact that four out of five earthquakes that occur are in Alaska.

DR. WEST agreed; the pie chart on slide 16 demonstrates that four out of five earthquakes in the U.S. occur in Alaska.

SENATOR MICCICHE asked where you put your money; in an early warning system that might provide 10-15 seconds of advance warning or in better engineering for structures and other safety precautions that are beneficial.

DR. WEST responded it's an excellent question.

He displayed slides 19 and 20 that show the monitoring network throughout Alaska. He pointed to the yellow and orange dots throughout the state and explained they are part of a massive, temporary deployment by the National Science Foundation. It is a 3-4 year experiment recording high resolution data. The earthquake center and the state have been the tremendous beneficiary of this experiment, but it all goes away in 2020. All the instrumentation represented by the dots will be removed and the state will revert to the monitoring system it's had in the past. Responding to a question from the chair, he confirmed that the red dots, which have built over the years by the earthquake center and others, would remain.

SENATOR KIEHL asked if this means he'll get fewer and less reliable tweets from the earthquake center.

DR. WEST replied there will be fewer and less reliable tsunami warnings, less reliable tweets, more jitter in the magnitude, less clarity in the information, and less resolution in where the shaking was and was not strong.

CHAIR HUGHES advised that in an earlier meeting Dr. West said the National Science Foundation has run this experiment across the U.S. and a number of states have elected to purchase and retain the monitors in their states. She said that is an option for Alaska and Dr. West has been working on it with the Alaska delegation. She asked him to talk about the fact that the federal government is more focused on the Lower 48 and that Alaska is a bit "behind the 8 ball" regarding monitors.

DR. WEST offered his perspective that on the national level, Alaska is often treated as a backwater. Alaska has a lower population and doesn't fit the national mold in a number of ways. He said he's quite comfortable saying that there has been

a decades long, chronic lack of federal investment in the earthquake monitoring system in Alaska.

CHAIR HUGHES asked him to update the committee on the conversations he's had with the congressional delegation about retaining the instrumentation.

DR. WEST explained that for the last few years the university has had a significant initiative to retain about half of this federal instrumentation network. Engagement at the federal level has been excellent and has included initial funds from various federal agencies. He emphasized that the congressional delegation has been outstanding in its support. There is real potential to sustain this facility for long-term operation through the support of multiple federal agencies that are using this data live today, he said.

CHAIR HUGHES asked if he agrees that another silver lining of the November 30 earthquake is an increased awareness at the federal level.

DR. WEST replied that particular earthquake ought to be instrumental in helping build the case but between the holidays and the federal shutdown there has not been much interaction with their federal partners. However, a day doesn't go by that there aren't high-level discussions with NOAA, USGS, the National Science Foundation, and others, he said.

DR. WEST noted that a capital request in the university's budget, that predates the November 30 earthquake, includes starter funds to retain some of the federal monitors.

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SENATOR MICCICHE asked if there are about 185 monitoring stations currently in Alaska.

DR. WEST agreed and added that retaining 80 sites would put Alaska on par with basic capabilities across the Lower 48.

He noted that the university has a capital request in the university's budget for \$300 million. He related that the yellow dots on slide 20 reflect what they envision in federal support. He said this has been a heavy lift and reiterated that the capital request is intended to help in the next few years to bring in the full support of the federal agencies.

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DR. WEST emphasized that building codes in Alaska are ultimately premised on the history of the seismic data, including the earthquakes that took everyone by surprise. He also reminded the committee to keep the tsunami component on the radar because in Alaska they are both part of the "same bad day." He directed attention to slide 24 that demonstrates that the main road in and out of Seward is well within the tsunami zone. The next earthquake will look different than the last and it's very plausible that the next significant event will include a tsunami component. He also stressed the importance of instrumental recording. To know whether Eagle River actually shook harder than downtown Anchorage, instruments that record the data have to be in place and working. He directed attention to slide 25 that shows the seismometers in key locations throughout Fairbanks. He noted that many of the instruments are at schools, which is a double benefit. Partnering provides better monitoring data and it provides information about particular facilities. He highlighted that a handful of bridges are instrumented, generally through the U.S. Geological Survey. Looking at doing things better, he recommended finding key places to include instrumentation so there is hard data to work with. He noted that is a policy recommendation from the Seismic Hazard Safety Commission.

CHAIR HUGHES asked if she heard correctly that there are no monitors in Eagle River and Chugiak.

DR. WEST replied there is one recording instrument at the fire station in Chugiak but none in Eagle River. He related that the maps that show shaking are based on point measurements put together with algorithms. He emphasized that they are estimates and can't be expected to replace actual measurements.

CHAIR HUGHES offered her understanding that he had checked on a seismic instrument located in the Capitol that was installed 50 years ago.

DR. WEST confirmed that he did check on an instrument that the building manager found several months ago. He will do further forensic work, but he suspects that it dates back to the 1960s. He noted that the building currently is not instrumented but that will be remedied going forward. He added that it's an example of instrumenting key facilities.

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SENATOR MICCICHE directed attention to slide 25, "seismometers in key locations." He drew a parallel between the movement at

the top of a multistory building during an earthquake and the movement on the flying bridge of a vessel when the water is rough. He asked if there is a lag and that the movement at the top is more intense.

DR. WEST confirmed that the slide, which reflects the five recordings from the UAF engineering building, shows progressively larger movement going toward the fifth floor. Instrumented buildings in Anchorage, such as the Atwood Building and the Hilton, provide even better examples of this phenomenon. He recalled that the recordings at the top of the Hilton were three times what they were on the ground level and this is expected. Buildings are engineered and built to accommodate this.

CHAIR HUGHES asked him to continue.

DR. WEST restated his final talking point which was that the next earthquake will not be a repeat of November 30, 2019. "We need to be careful not to think of how to plan for that specific event. It will be different."

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CHAIR HUGHES thanked Dr. West for the presentation and his work. She invited Mr. Kemp and Mr. Hodgin from the Department of Transportation and Public Facilities (DOTPF) to the table.

[2:15:08 PM](#)

DAVE KEMP, Central Regional Director, Department of Transportation and Public Facilities (DOTPF), Anchorage, related that, for him, the earthquake started last March with the Eagle River bridge strike. When that happened, he realized that the department was not properly prepared for that kind of emergency. To remedy the situation, training was initiated using FEMA's Incident Command System. He explained that this is a method of dividing responsibilities and running tabletop exercises so everyone will understand their role and be ready to go should an incident occur. Part of the process was to use the incident command structure to practice on simulated incidents such as avalanches, minor flooding, and additional bridge strikes.

CHAIR HUGHES asked where the incident command center for the exercises was located.

MR. KEMP replied it was in the DOTPF aviation building at the airport. Continuing the presentation, he displayed an example of the substantial damage to the DOTPF deputy director's office.

His office just down the hall suffered almost no damage. He also displayed the example of the severely damaged section of the Glenn Highway near Mirror Lake.

CHAIR HUGHES opined that somebody is looking out for Alaskans when this much damage occurs without serious injuries or death. "It makes me incredibly grateful," she said.

MR. KEMP highlighted some of the close calls that motorists had.

He reviewed the immediate response timeline following the Friday, November 30 earthquake:

- 8:29 a.m. 7.0 earthquake followed several minutes later by a 5.7 aftershock
- 8:35 a.m. Aviation Building evacuated and cleared
- 8:44 a.m. First DOT&PF Facebook post reporting damage and establishing hashtag #AlaskaEarthquake
- 9:30 a.m. DOT&PF Emergency Operations Center (EOC) up and running
- 10:15 a.m. Traffic control & Anchorage Police Department on site Minnesota & International
- 10:30 a.m. Repairs started on Minnesota & International
- 11:08 a.m. Earthquake webpage up and running to inform the public
- 11:34 a.m. First electronic Situation Report published

He related a story about someone who complained that the road damage at Minnesota and International was fixed so quickly he didn't have an opportunity to view the damage.

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SENATOR MICCICHE asked if the department had a website to keep the public informed before the earthquake.

MR. KEMP replied the public information officer posts on their website, Facebook, and Twitter to keep the public informed about events such as floods, avalanches, and other things. This is ongoing.

MR. KEMP displayed a picture of the incident command structure that was up and running in two hours and was operational 24/7 from November 30 to December 3. There were day and night incident commanders, a public information officer, and individuals in charge of maintenance, contracting, and design.

CHAIR HUGHES asked if implementation went smoothly because of the training or if they learned things to add to the list for the next event.

MR. KEMP deferred the question to later in the presentation. He related that he was confident as incident commander because a number of people on staff are former military and had been through trainings and actual incident commands. He cited an example to demonstrate that the transition from incident command to project management was smooth.

SENATOR KIEHL asked how many contingent locations were identified.

MR. KEMP replied the one fallback location was the annex where Public Facilities is located, and it suffered more damage than the primary location. Mr. Hodgins's team conducted a structural inspection to make sure things were safe. He noted that air quality was a concern and they didn't have masks so those are on the list. He admitted that he showed the office with the worst damage and highlighted that downstairs suffered very limited damage.

CHAIR HUGHES asked if he was aware of any incident command plans and identified locations for the other regions of the state.

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MR. KEMP replied he was not aware of any plans for other areas but people from all the different regions came together to make the response a success.

CHAIR HUGHES asked if he would follow up, so the legislature is sure that all regions of the state have a similar plan and are prepared for a disaster.

MR. KEMP said yes.

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SENATOR MICCICHE observed that the ICS structure appeared to be more fit for this purpose than the military ICS structure. He asked if this is a nation model for a department of transportation response.

MR. KEMP replied the model came directly from FEMA and the ICS leadership team took all the courses that were offered. He agreed that it is a little different than the military ICS.

He continued to say that the next steps were to: 1) determine the extent of the damage, 2) prioritize which work to do, 3) communicate the priorities with the team (staff, consultants and contractors), and 4) communicate with the public.

MR. KEMP listed the five sources of information used to determine the extent of the damage: 1) maintenance staff in the field, 2) bridge inspectors, 3) construction teams, 4) consultant team, and 5) the public.

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MR. KEMP displayed a map that shows some of the 160 locations that have been identified as DOTPF highway damage sites. He explained that FEMA allows 180 days to identify and start working on repairs. Because this is mid-winter, a 90-day extension was granted.

CHAIR HUGHES asked if he expects to see more damage after breakup than in a typical spring.

MR. KEMP said yes; he's seeing new bumps and humps on Minnesota every day on his way to work. It's a concern that there may be changes in slope stability and culvert damage that isn't readily apparent.

He stressed that a key issue is the ability for the leadership team, staff, consultants, and contractors to communicate with one another. If cellphones and email doesn't work, radios are the fallback so it's important that they're in working condition with fresh batteries and people know how to use them.

MR. KEMP advised that to keep the public informed the public information officer was on social media and updated the webpage continually. He opined that the PIO did an excellent job.

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To demonstrate how quickly repairs were made, he displayed a picture of the damage to the Minnesota Drive northbound onramp to the airport immediately after the earthquake and four days later on December 4, 2018 after it was repaired. He said it was a unique experience to do things without permits or budgets and it was fun to lead a team that was dedicated to effecting repairs as quickly as possible.

MR. KEMP directed attention to the pictures of the Willow Fishhook Road on November 30 just after the earthquake and on December 10 after the apron slope and some of the asphalt was

repaired. He said the majority of the repairs that were done will need to be done again because they were done in the winter when paving generally isn't done.

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SENATOR MICCICHE observed that there might be some commonality between the damaged sections of highway. He asked if they took enough time to understand the factors that led to the failures so that different construction methods could be used in the future.

MR. KEMP explained that when they revisit the sites in the spring, geotechnical investigation will be done to look at what led to the failure and to ensure that the follow-up repair is permanent. He added that they will look at bridge failures the same way.

SENATOR MICCICHE cited Turnagain Arm bridge failures in the 1964 earthquake and the pancake bridges on the LA interstate and said the relationship of VSM versus horizontal structures is very complicated. He asked if that is something that DOTPF will also evaluate.

MR. KEMP deferred to Richard Pratt, the chief bridge engineer for DOTPF.

CHAIR HUGHES asked if small planes and drones were used to assess the damage.

MR. KEMP replied most of the photos came from drones. Each of the maintenance stations has a drone to respond to incidents, so people at the incident command center could see what someone was talking about. They also use Survey 123, which is an application that allows someone with a cellphone or laptop to take a picture that has GPS coordinates.

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CHAIR HUGHES recalled encouraging DOTPF to start using drones four years ago.

MR. KEMP displayed pictures of the Glenn Highway at Mirror Lake on November 30 after the earthquake and on December 5 after the repair. He said this damage didn't get as much press as Minnesota International, but it was high risk and had the potential to lose both northbound and southbound lanes because of sloughing. Transportation departments across the U.S. asked

how the repairs were done so quickly and he credited Alaska contractors and their attitudes.

He displayed pictures of the damage on the Glenn-Parks Interchange that will need geotechnical exploration to determine why it failed where it did.

A picture of the northbound lane of the Eagle River bridge shows a three inch drop at the break in the asphalt. The contractors milled it down and traffic was back on the bridge fairly quickly.

Pictures of the Seward Highway at Dowling show cracks running through the asphalt. The only reason this sort of damage was identified is that there was very little snow. The public, contractors, consultants, and crews all feed information to DOT about this sort of damage.

MR. KEMP displayed a picture of the extensive damage the Briggs Bridge and pedestrian tunnel suffered when a waterline ruptured. The department is working with the Anchorage Water & Wastewater Utility (AWWU) on these repairs. He pointed to the rockfall damage on the Seward Highway and described the challenges presented by the high vertical rock face alongside the highway that routinely sloughs. The road was reopened quickly but this corridor routinely presents problems. Cutting the entire rock face back is cost-prohibitive and a landslide consultant has been engaged to advise on interim solutions.

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He displayed pictures of the earthquake damage to Vine Road and the repairs the department quickly effected in partnership with Mat-Su. He pointed out that the crew not only repaired and paved the road in the winter, but also striped the new asphalt. He noted that this section is another that will likely need to be rebuilt. The road failed where it crossed a slough as opposed to either side that is forested and suffered no damage. He said the soils in that area are probably unstable, but that geotechnical investigation will help explain why and how this happened.

SENATOR MICCICHE commented that it's obvious where this failed and it appears to be a prime candidate to reevaluate whether a bridge versus a ground-based highway is applicable.

MR. KEMP turned to slides 26 and 27 to discuss the results of the hot wash method of road repair and the three meetings to discuss what they learned about improvements going forward. He

noted that the incident command center lacked an areawide map, and equipment that wasn't available included masks for those inspecting buildings and a sniffer to detect gas leaks.

CHAIR HUGHES asked if the Central Region planned to share that information with the other regions.

MR. KEMP said yes.

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MR. KEMP turned to slide 28 and listed the following current activities: [original punctuation provided]

1. Identify additional damage due to earthquake & aftershocks (Ongoing)
2. Request additional support to deliver our normal program & all of the addition earthquake work (Request submitted)
3. Request 90 day extension of the Federal Emergency Management Agency (FEMA) 180 day time limit for earthquake damage (Approved)
4. Accounting, negotiating and paying for all the emergency work (Ongoing)
5. Establishing contracts for all the 160+ locations that will require permanent repairs (Ongoing)
6. FEMA disaster declaration (Approved)
7. Current contracts total \$7.27M

CHAIR HUGHES asked if the FEMA dollars go directly to DOTPF, bypassing the legislative appropriation process.

MR. KEMP said he'd follow up with the answer.

MR. KEMP concluded the presentation highlighting the response Central Region gave to other state transportation departments that asked, "How did DOT do that in Alaska?"

- Last spring, we realized that we were not sufficiently prepared to perform during an emergency.
- We undertook training and practiced what we learned in our training.
- We have a very close working relationship and trust with the contracting community.
- We are fortunate to have contractors who were ready, able and willing to get to work immediately with only a handshake.

- Alaskans know if we don't do it, there isn't going to be anyone else coming to help.

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SENATOR KIEHL asked for a ballpark estimate of how much higher the repairs will be because this occurred in the winter.

MR. KEMP said he could not give a percentage, but the head of construction for the region says that the bills so far seem to be reasonable considering the level of effort that was put forth.

SENATOR KIEHL asked for a follow up once the numbers crystalize.

CHAIR HUGHES asked him to forward the information to her office. She asked Mr. Hodgkin if he had anything to add.

[2:51:00 PM](#)

CHRIS HODGIN, Facilities Services Project Manager, Department of Transportation and Public Facilities (DOTPF), Anchorage said he and Mr. Pratt would give an overview of the response metrics, a high level look at the damage and repair efforts, and the steps moving forward.

He related that the immediate actions included team welfare and safety checks and an assessment of needs for the response center. They assembled a response center at the facility annex to liaison with the DOTPF headquarters response center. This included support personnel from Anchorage, Fairbanks, and Juneau. At the same time, facilities maintenance people were deployed to do rapid evaluations of the facilities and ascertain the immediate repair needs to open the facilities as soon as possible. The first night the operations manager from Fairbanks and the project coordinator from Juneau joined the response team.

MR. HODGIN explained that the facilities were evaluated and prioritized based on the affected intensity zones, starting with critical facilities in the highest zones. Facilities that were occupied 24/7 like API [Alaska Psychiatric Institute] and McLaughlin Youth Center were prioritized first.

The immediate repairs were initiated by facilities technicians and maintenance personnel partnered with local contractors. Other facilities that were immediately repaired were the DOTPF headquarters, the DOTPF annex, and the Boney Courthouse. The contractors that were involved were janitorial, mechanical,

electrical, and environmental. Because of these efforts, the majority of affected state buildings were ready to resume operations within four days following the earthquake. Safety assessments were occurring simultaneously. These teams were comprised of architects, engineers, divisional staff, volunteer engineers from the Structural Engineering Society of Alaska, and out of state engineers from North Carolina and California. These inspections followed the nationally recognized ATC-20 Post Earthquake Detailed Evaluation protocols. This allowed consistent postings of the buildings: green indicated inspected, yellow indicated restricted use, and red indicated unsafe. He directed attention to the timeline on slide 31 that lists the activities within the first two weeks of the earthquake. He noted that there were detailed assessments in the MatSu and Kenai Peninsula boroughs.

[2:54:08 PM](#)

MR. HODGIN reported that the response metrics included strong collaboration with partner agencies. There were daily stakeholder communications to provide updates on building inspections and repair status. The detailed safety assessments were the result of teams inspecting 369 state facilities over 12 days and inspection assistance to state-owned facilities in the MatSu and Kenai Peninsula boroughs. A majority of the state facilities were identified as green, 13 were designated yellow or restricted use, and none were found to be red or unsafe.

He reviewed the damage summary. For state facilities, the most significant damage was found to the DOTPF headquarters and the Boney Courthouse. Temporary repairs have been completed. The majority of state facilities in Anchorage, MatSu, and Kenai Peninsula Borough sustained comparatively minor damage. Common damage included cinderblock type construction, ceiling grid, and sheetrock cracks. Estimates for permanent repairs range from \$6 million to \$10 million. He said those numbers will continue to be updated. He advised that they are currently working with risk management and the state emergency office to coordinate the repair work. The timelines for repairs will vary depending on severity and the processes and requirements of the different funding sources.

CHAIR HUGHES thanked Mr. Hodgin and asked Mr. Pratt to respond to Senator Micciche's question about bridges.

[2:56:41 PM](#)

RICH PRATT, Chief Bridge Engineer, Department of Transportation and Public Facilities (DOTPF), said he has about 35 years'

experience in bridge engineer. He related that his overall reaction to the earthquake is that we got pretty lucky and the bridges in the area came through relatively well.

He explained that DOTPF's bridge office responded from Juneau and teamed up with the bridge maintenance team in Fairbanks. Responding to Senator Micciche's earlier question, he explained that the program for bridge inspections calls for annual inspections by the department's professional bridge design engineers. This is the team that responded to the event. These engineers have the reports on all the affected bridges and have been routinely inspecting them at maximum every 24 months. He noted that these inspections require boots on the ground work, so these people had to be prepared to spend their days outside in the icy conditions under bridges.

2:58:47 PM

CHAIR HUGHES asked if his team was involved with the March Eagle River bridge incident.

MR. PRATT said yes; a bridge inspector in Anchorage responded that day and by that evening a bridge engineer from Juneau took over the engineering responsibilities for the repair and reopening of the Glenn Highway. The response was similar when the dump truck struck the Tudor Road overpass last month.

He reiterated that four teams from Juneau and one from Fairbanks responded to the earthquake. They prioritized 300 bridges that needed inspections and accomplished this over four days. They didn't find any significant damage. Those bridges were prioritized in the normal prescribed approach. Dave Kemp's local maintenance teams went out initially to identify anything significant and report the findings to the bridge office who follows up within 24-48 hours. He noted that high-traffic routes like the Glenn Highway, the Seward Highway, and Minnesota Drive were also prioritized. Consideration was given to the age of the structures, whether the bridges had been strengthened to improve their seismic performance, whether the bridges had known vulnerable details, and if the bridge had an identified issue. He explained that some structural details are known to be more vulnerable than others.

3:00:49 PM

MR. PRATT pointed to the graphic on slide 37 that shows the contours of ground shaking with bridge locations superimposed. The next slide shows the ground slipped 16 inches vertically when the slope failed in front of the wingwalls and abutments on

a bridge near Eagle River. He said bridges are founded on pilings that go 50-150 feet into the ground, so this indicates that the soil failed below. He explained that the graphic on slide 39 shows the underside of a relatively new bridge that carries Dowling Road over the top of Arctic Boulevard in Anchorage. A shear key cracked due to the lateral load of the earthquake that tried to push the bridge sideways off its supports. He noted that shear keys function like electrical fuses that fail before a more critical part of the infrastructure fails. The shear key did its job and kept the girders on the supports. He reported that 19 bridges still require some form of repair and the estimated repair costs are \$860,000.

[3:02:52 PM](#)

MR. PRATT, responding to Senator Micciche's earlier question, said the department learned a lot from the 1964 earthquake when a lot of bridges collapsed in Turnagain Arm. They also learned a lot in the 1970s and 1980s when bridges collapsed in the California earthquakes. He said the key is to keep the girders on the abutments and piers and off the ground. No collapse is the national design standard for bridges and DOTPF follows those design standards. He shared that he chairs the committee that writes the national standards for seismic design for bridges and a colleague wrote two of the chapters. He described Alaska as a leader in this area. He said he wasn't sure how much they learned other than that what they've been doing seems to have worked in this event. It could have been otherwise but not because anything is wrong or substandard. The earthquake was 30 miles deep and there was a lot of shaking where the ground was disturbed but the structures don't appear to have been disturbed in the same way.

[3:04:29 PM](#)

SENATOR MICCICHE thanked him for the answer and asked if some people within DOTPF thought that Vine Road should have been a bridge.

MR. PRATT said bridges are at least ten times more expensive to construct than roads. In the example of the bridge with the cracked shear key ground improvements were done and it helped but the cost was \$3 million for just the two abutment sites. Other strategies could be used such as removing the vulnerable soil. The geotechnical engineers consider that and optimize their designs based on that to the best of their ability.

SENATOR MICCICHE said it comes down to a cost benefit analysis in every case.

MR. PRATT agreed.

[3:06:43 PM](#)

CHAIR HUGHES thanked the presenters.

SENATOR MICCICHE suggested she extend a huge thank you to DOTPF for its response.

CHAIR HUGHES said everyone is most grateful for the response and preparedness of all the DOTPF employees.

[3:07:48 PM](#)

There being no further business to come before the committee, Chair Hughes adjourned the Senate Transportation Standing Committee meeting at 3:07 pm.