**FAA ACPTP Advancements**

**Tech Tuesday Webinar Q&A**

**6/17/2025**

1. How about refining failure model of PCC shoulder pavements? (MO)

   We will propose this to the Program Coordination Group, but I do not think they will likely prioritize this suggestion. Refining the model for the shoulder pavements lies within the jurisdiction of the FAA Technical Center. FAARFIELD would need to be adjusted to accommodate the refinement, which the ACPTP would not have access to the source code and doubt the FAA would relinquish that computer code. I believe the current procedure requires a few passes of the critical aircraft but without pavement failure. In our view, refining the model would require the FAA to decide on what damage to a shoulder is tolerable in the rare event an aircraft traverses the shoulder. The failure models would need to be defined and programmed into FAARFIELD, and this would be outside the scope of the cooperative agreement.

2. Rubber build up is continuously coming up. is there any idea what the recommendations will look like for this issue? (NY)

   The research driver for the project was the continual damage being seen on newly constructed pavement across the country. The Airport Cooperative Research Program (ACRP) developed a primer some years ago, which addressed the rubber removal process, but the primer simply documents how various airports handled rubber removal. No guidance or recommendations was given. Additionally, no FAA guidance or standard on rubber removal exists. What we found was that airport operations were dictating the rubber removal schedule and contractors simply turned up the water pressure to remove all rubber deposits in the given timeframe. Some pavements could handle the pressure while others could not and were damaged. The preliminary recommendations for this research will most likely recommend some best practices for rubber removal and employment of a test section to determine the process, speed, and water pressure to be used. Other guidance may be included such as the use of rubber removal chemicals for the pavements that cannot stand up to the high-water pressure removal process.

3. What is ASR? (IA)

   Alkali silica reaction (ASR) is a chemical reaction between some siliceous aggregates and alkali hydroxides in the paste, that eventually results in expansion and cracking of concrete. More information is available at https://www.cptechcenter.org/wp-content/uploads/2020/12/MAPbriefWinter2020.pdf

4. Why only use/mention Class F flyash? What about Class C? C and F combined gives 90% nationwide coverage (depending on budget allowances) (PA)

   The main purpose of pozzolans in concrete pavement is to mitigate ASR expansion. Different classes of fly ash are made up from different constituents, depending on the type of coal that was burned that created the fly ash. Without getting into the exact chemical composition of various fly ashes, simply put, fly ash has some good stuff ($SiO_2$eq) that will mitigate ASR expansion, and some bad stuff (CaOeq) that exacerbates expansion. The effectiveness of the ash depends on the ratio of good stuff to bad stuff ( or it may be bad stuff to good stuff, I cannot remember). The CaOeq content of the fly ash generally must be kept around 18% or less for it to be an effective mitigator. But again, it depends on how much $SiO_2$eq is in the ash. If the $SiO_2$eq is high enough the ash can mitigate ASR expansion. But mitigation is rare if the CaOeq content exceeds 18%. One can argue that a very high replacement rate of Class C ash can mitigate ASR expansion, but the problem of cracking from ASR expansion is simply moved to cracking from finishing issues resulting from high replacement rates of fly ash for cement. Neither are good for airfield pavements. So, the FAA has set a limit of the CaO content of the fly ash currently to 15%. This may change to reference the 18% in ASTM C618 because we are eliminating some decent fly ashes by specification. The ASTM C1567 mortar bar expansion test can confirm the pozzolan mitigates ASR expansion. ASTM C618, which defines the classes of fly ash, has set the difference between Class F fly ash and Class C fly ash at 18% CaO content. So, Class F fly ash has 18% or less CaO content and Class C fly ash has greater than 18% CaO content. This is not the only separator but generally speaking, this is how many define the difference.

Typically speaking in terms of mitigating ASR in concrete, we look at the locally available Class F fly ash since Class C fly ash normally does not meet the FAA specification requirements. This is a complex issue, and I have oversimplified the discussion here to very general terms. To really understand if a particular fly ash will mitigate ASR, a more rigorous analysis using the chemical constituents must be performed to understand the ASR risk from a particular fly ash. FAA does not want to fund the risk that a sponsor may come back before a project is eligible for funding to reconstruct pavements where marginal fly ashes are used. They went through this in the late 1990s and early 2000s, when we saw pavement failures due to improper screening of materials, which included using Class C fly ash in pavements the exacerbated some of the ASR reactions. So as a general rule, only good class F fly ashes are used in airfield pavements. Research is still on-going around this issue.