University-Based Asphalt Materials and Flexible Pavements Education: Developing a Roadmap and Action Plan

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Our Chat Today...

- Curricular constraints at U.S. universities
- Personnel and resource challenges
- A pavement engineering “body of knowledge”?
- Potential solutions
Curricular Constraints

• State Mandates on Program Size (credit hours)
  o Push for retention/graduation, lower costs
  o Some states as low as 120 hours for BSCE

• General University “Core”
• State-Mandated “Core”
Curricular Constraints

• ABET
  o General Criteria (Criterion 3, Outcomes “a” thru “k”)
    a) Math & Science  f) Ethics  k) Modern Engineering Tools
    b) Experiments    g) Communications
    c) Design         h) Societal/global impacts
    d) Teamwork       i) Life-long Learning
    e) Engr Problems  j) Contemporary Issues

  o Civil Engineering Program Criteria

The curriculum must prepare graduates to apply knowledge of mathematics through differential equations, calculus-based physics, chemistry, and at least one additional area of basic science; apply probability and statistics to address uncertainty; analyze and solve problems in at least four technical areas appropriate to civil engineering; conduct experiments in at least two technical areas of civil engineering and analyze and interpret the resulting data; design a system, component, or process in at least two civil engineering contexts; include principles of sustainability in design; explain basic concepts in project management, business, public policy, and leadership; analyze issues in professional ethics; and explain the importance of professional licensure.
Personnel and Resources

• Qualified faculty (or lack thereof)
  o Research mission
    ▪ Funding sources; overhead constraints
  o Teaching loads
    ▪ Inclusion of required and/or elective courses at UG level
    ▪ ‘Band width’ for viable graduate program

• Resources
  o Textbooks / instructional materials
  o Laboratory space and equipment
A Body of Knowledge (BOK) for Flexible Pavement Engineering?

- Minimum ‘exposure’ to flexible pavements and materials – all CE undergraduates
- Content for an emphasis (selected electives) in flexible pavements
- Minimum content for pavement/materials based MS, PhD

<table>
<thead>
<tr>
<th>General Pavement Life-Cycle</th>
<th>Design</th>
<th>Materials</th>
<th>Construction</th>
<th>Maintenance and Preservation</th>
<th>Rehabilitation</th>
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Associated Topics:  
- Capstone(?)  
- Sustainability  
- Pavement Management  
- Airports
Potential Path(s) Forward...

• Professor Training
  o NCAT, AI, NHI, Industry
  o Short-course; webinars; videos; formal distance-ed

• Instructional Materials
  o Texts
  o Industry/Agency based guides, manuals, specifications
  o Online resources (i.e. Pavement Interactive, YouTube)
  o Shared online courses between universities

• Laboratory Resources
  o Industry/Agency/University partnerships
  o Shared / online ‘virtual’ laboratories
What Can the ETG Do?

- Remember, this is **outreach not research**
- Encourage establishment of resource repository
  - Funding
  - Updating
  - Oversight
  - Publicity
- Establish task force to come up with plan
- Coordinate with Academy of Pavement Scientists and Engineers (APSE)