Seeking BALANCE On Our Journey Along an Asphalt Pavement

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Where are we going today?

• Our Context
• Some Examples – and Questions
• What Happens Now? Where Do We Go From Here?

Examining “Balance”: Context
Balance: Pavement Design

BUT...What if...

We DESIGNED the Life Cycle intentionally?

Nice theory – but future maintenance, preservation, and rehab treatments depend on how the pavement actually performs!

BUT...What if...

We PREVENTED distresses rather than simply PREDICT distress?
BUT...What if...

We BALANCED

Structural Design Mix Design Materials

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Pavement Layers: Roles?

Protect the base / subgrade
Provide durable wearing surface with comfortable ride under traffic

Asphalt

Intermediate

Base

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A Traditional Approach: Arkansas

Binders: PG 64-22
PG 70-22
PG 76-22

9.5 mm, 12.5 mm NMAS
P_e based on 4% Air Voids
1993 AASHTO: a_1 = 0.44
MEPDG: E
Density: 92-96% of G_{max}

Asphalt (Surface Mix)

8.5 mm, 12.5 mm NMAS
P_e based on 4% Air Voids
1993 AASHTO: a_1 = 0.44
MEPDG: E
Density: 92-96% of G_{max}

Asphalt (Binder Mix)

25 mm NMAS
P_e based on 4% Air Voids
1993 AASHTO: a_1 = 0.44
MEPDG: E
Density: 92-96% of G_{max}

Asphalt (Base Mix)

37.5 mm NMAS
P_e based on 4% Air Voids
1993 AASHTO: a_1 = 0.36
MEPDG: E
Density: 90-94% of G_{max}

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Pavement Layers:
The right mix in the right place, for the right purpose

- **Asphalt**
  - Ride quality
  - Rut resistant
  - Crack resistant
  - Durable (time/climate)

- **Intermediate**
  - Protect underlying layers
  - Support surface layer
  - Rut resistant
  - High modulus (stiffness)

- **Base**
  - Protect underlying layers
  - Support upper layers
  - Crack/fatigue resistant
  - Durable (moisture damage)

**Polymers?**
**Balanced Mix Design?**
**Recycle?**
**High binder?**
**Low voids?**
**No recycle?**
**Moisture damage additives?**

What Does This Mean for Research??

- **APPLIED research**
  - We have issues needing solutions
  - NOW

- **FUNDAMENTAL Research**
  - What does the "next generation" of asphalt pavements look like?

**R & D – and I??**

**RESEARCH (R)**
- Theoretical basis
- Parametric studies
- Proof-of-concept

**DEVELOPMENT (D)**
- Equipment/Procedures
- Ruggedness
- Precision & Bias

**IMPLEMENTATION (I)**
- Pilot projects
- Special Provisions
- Standard Specifications
Where are we going?

• BALANCE: not “either...or” – but “and”
• INTEGRATION of life stages
  ▪ PREVENTION > PREDICTION (??)
  ▪ materials...and...structure...and...construction
  ▪ ...and...maintenance...and...preservation...and
  ▪ ...rehabilitation
  ▪ INTENTIONAL design of the life-cycle

• R – D – and I
“There will be days...when you step out of the phone booth and try to fly, and the very people you want to save are the ones standing on your cape.”

Sarah Kay
TED 2011

What is holding us back???

Never, never, never give up.

Questions??

THANK You!!!

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