

An Indiana Case Study: Building Quality Asphalt Pavements with Industry and Agency Partnership

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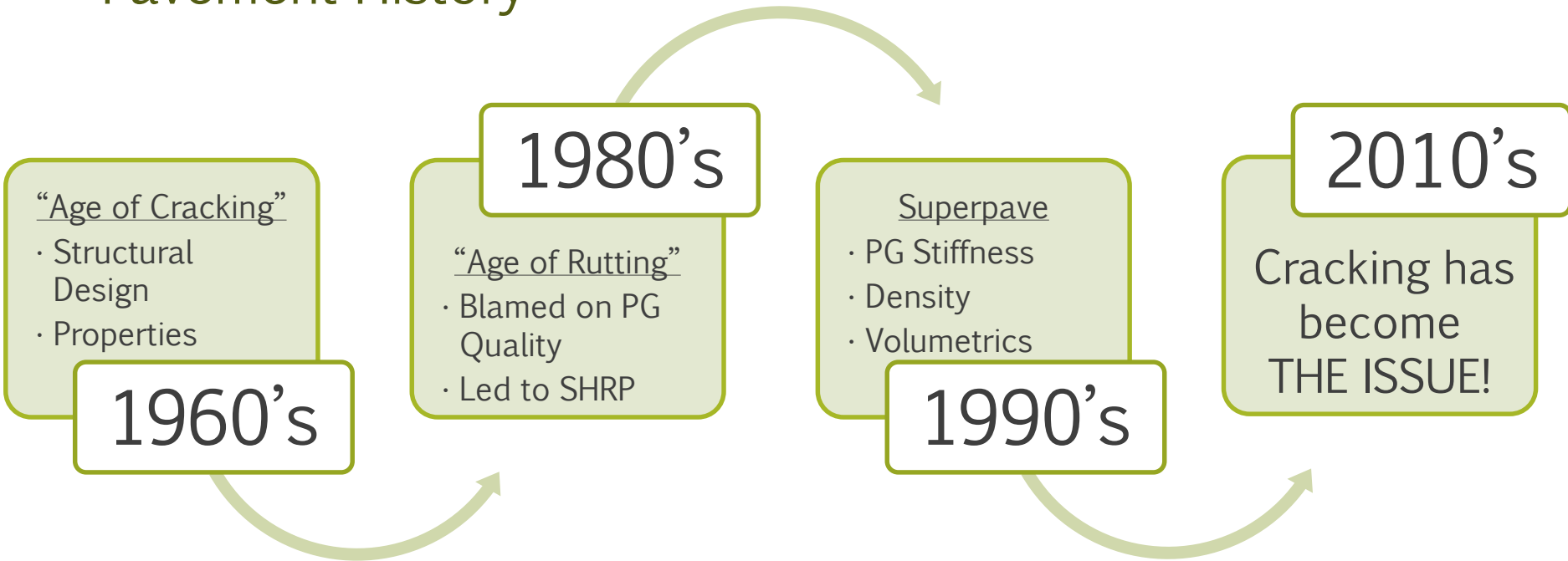
About Asphalt Pavement Association of Indiana (APAI)

- State Not for Profit Trade Association formed in 1959.
- 25 producer and contractor members, 6 binder supplier members and approximately 80 associate members, including consulting engineering firms and Indiana universities with civil engineering and construction management programs.
- Governed by 19 member Board of Directors and 9 member committees.
- Two full-time staff and one part-time consultant, with outsourced meeting planning, accounting, and marketing/PR agency.
- \$50k awarded in college scholarships in 2017 to students at five universities.

Presentation Outline

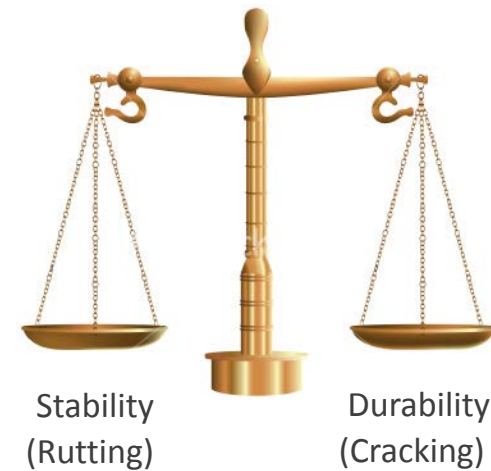
- Asphalt Cracking Problems
- Impact of Aggregate Gsb on Asphalt Content
- Indiana Specification Changes and Solutions
- Partnering Session with APAI and Indiana DOT
- Steps for Highway Construction Associations to Improve Relationships with Public Customers

Pavement History



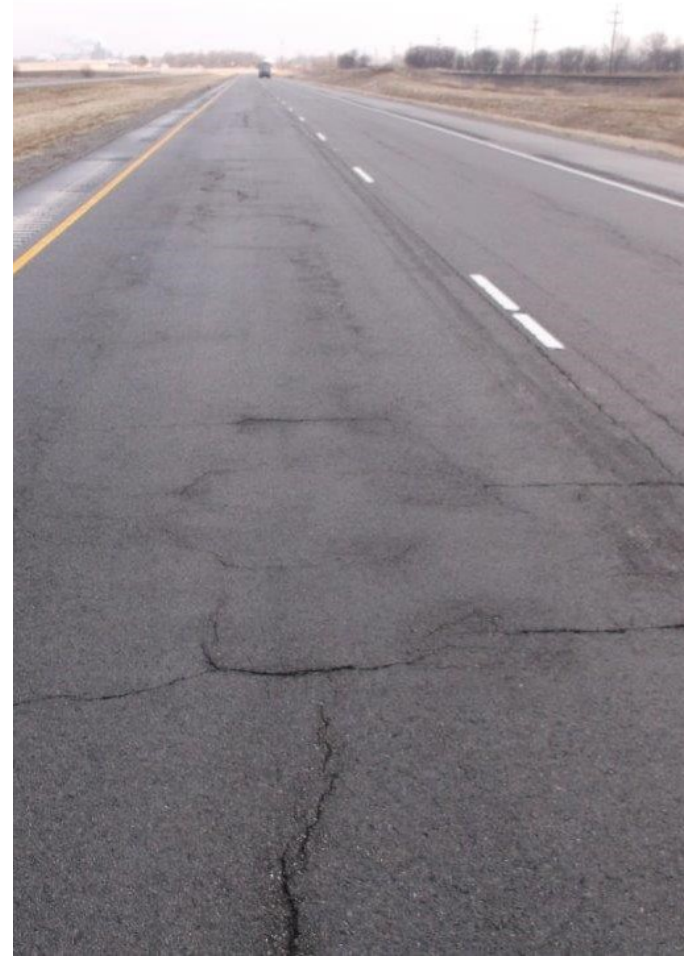
Discussion on Cracking Solutions

- Reduce RAP
- Reduce or ban RAS (shingles)
- Ban VTAE (REOB)
- Increase Asphalt Content



Indiana Cracking Problems

- Indiana roads showed signs of early fatigue in 2014.
 - DOT specifications
 - Enforcement of specifications
 - Mix design compliance
- Solution was renewed emphasis on aggregate Gsb.



How Much Asphalt Binder is Needed?

- Total Asphalt Content
 - Outside Rock (Effective)
 - Inside Rock (Absorbed)



Minimum Effective Asphalt Binder (AASHTO M323)

Property	9.5 mm	12.5 mm	19.0 mm	25.0 mm
Voids in Mineral Aggregate, %	15.0	14.0	13.0	12.0
Air Voids, %	4.0	4.0	4.0	4.0
Minimum Effective Volume Asphalt Binder, %	11.0	10.0	9.0	8.0
Minimum Effective Weight Asphalt Binder, %	4.9	4.4	4.0	3.6

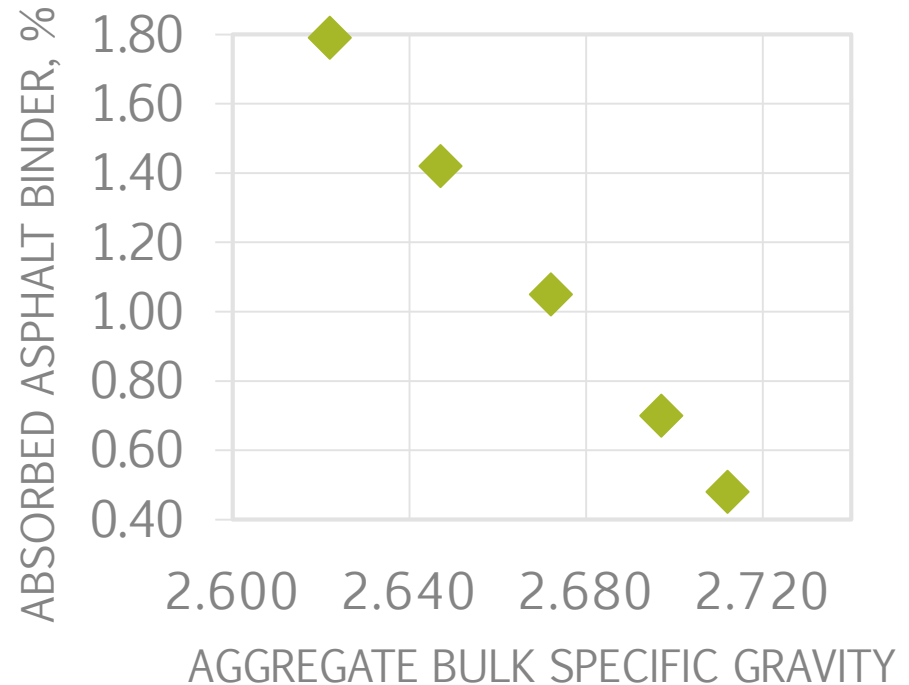
Total Asphalt Binder Content

- Effective asphalt binder plus absorbed asphalt binder.
- Absorbed asphalt binder increases as water absorption increases.

Water Absorption	9.5 mm	12.5 mm	19.0 mm	25.0 mm
1%	4.9%	4.5%	4.1%	3.7%
2%	5.6%	5.2%	4.8%	4.4%
3%	6.3%	5.9%	5.5%	5.1%
4%	7.4%	7.0%	6.6%	6.2%

Aggregate Bulk Specific Gravity, Gsb

- Calculation of absorbed asphalt binder content depends on Gsb
- Result is very sensitive to Gsb.
- Fine aggregate -D2S to +D2S creates 1.3% range of absorbed asphalt binder



Impact of Aggregate Gsb Example

- AASHTO D2S
 - Coarse Aggregate 0.038
 - Fine Aggregate 0.066
 - 50:50 Blend 0.052

Property	2.672	
Voids in Mineral Aggregate (VMA)	14.4%	
Volume of Effective Binder (V_{be})	10.4%	
Effective Asphalt Content (P_{be})	4.41%	
Calculated Absorbed Asphalt Content (P_{ba})	1.05%	
Asphalt Binder Content (P_b)	5.40%	

Impact of Aggregate Gsb Example

- AASHTO D2S
 - Coarse Aggregate 0.038
 - Fine Aggregate 0.066
 - 50:50 Blend 0.052
- Asphalt binder content reduced by 0.53%

Property	2.672	2.724
Voids in Mineral Aggregate (VMA)	14.4%	14.4%
Volume of Effective Binder (V_{be})	10.4%	10.4%
Effective Asphalt Content (P_{be})	4.41%	4.41%
Calculated Absorbed Asphalt Content (P_{ba})	1.05%	0.48%
Asphalt Binder Content (P_b)	5.40%	4.87%

Indiana Specification Changes

- Aggregate Gsb tests ran by INDOT and provided to contractor for mix design and production testing.
- Short-term aging increased from 2 to 4 hours.
- VMA pay factor increased from 10% to 35% and asphalt content eliminated as pay factor.
- Max binder replacement reduced from 40% to 25%.
 - Max binder replacement from RAS reduced to 15% and 3% by weight.

Indiana Outcomes

- Media publicity in September 2015.
- Industry and DOT already engaged in identifying issues and implementing solutions.
- Partnership session in November 2015.



Environment in 2015

- Lack of Trust in the Asphalt Industry and from Both Central and District INDOT offices and Key Managerial Personnel
- Lack of Communications between the Department and APAI
- Joint Committee Meetings No Longer Held or Scheduled
- Negative Local and National Media Coverage Resulting in Barrage of Phone Calls/Emails from LPAs within Indiana
- Suggestions Offered in Writing by APAI To Increase Asphalt Content in Mix Designs Not Implemented or Responded To

Achieving Commitment and Buy-In to Partner

- Selling Concept to Top Public Agency Leadership - TRUST
- Recruitment of Expert Facilitators by APAI (Experience in Highway Construction Adds Credibility and Confidence)
- INDOT Champions and Key Stakeholders/21 Participants
- APAI Champions and Key Stakeholders/16 Participants
- YOU NEED THE RIGHT PEOPLE IN THE ROOM OR FORGET IT
- Establishment of Ground Rules for Effective High Level Industry-Agency Partnering – Dealing with Sacred Cows

And So We Begin...8:00 am 11/20/15

- Welcome; by Larry Bonine, who introduces Dr. Randy West
- Self-Introductions from All Participants seated at half rounds
- Review of Agenda and Request for Changes to the Agenda
- Welcome by INDOT Commissioner Brandye Hendrickson
- Welcome by APAI 2015 elected President Jeff Swan
- Larry: Opens with a Leadership Vignette on Authority vs. Leadership, Communication vs. Culture in Today's Workplace

Relationship Exercises

- All 37 participants (21 INDOT, 16 APAI) break into work groups
- Trust Building Behaviors (both sides meet as joint groups)
- Reporting session moderated by Larry Bonine (white papers created by the individual work groups are discussed and posted on perimeter walls of meeting room)
- Confessions (agency only groups and industry only groups)
- Reporting session by Bonine (review of group white papers)
- Leadership Vignettes - Communications is 90% Listening, and Key Differences between Leadership & Authority

Trust Building Behaviors – Group A (Executive)

- Respectful communication
- Do what you say
- Active listening
- Acknowledge issues
- Follow through
- Honesty!
- Show you care!
- Seek to understand

Trust Building Behaviors – Group B

- Follow through
- Do the right thing WITHOUT someone whining
- Agree on end result goal
- Positive wind
- Do what you say
- Commitment

Trust Building Behaviors – Group C

- Communication
- Respond to requests
- Consistency
- Follow through on commitments
- Take responsibility
- Common goals
- Don't be mean
- Take time to listen

Trust Building Behaviors – Group D

- No surprises
- Follow through
- Do what you say
- Accept responsibility
- Honesty
- Respectful of other view
- Open mind

Trust Building Behaviors – Group E

- Do what you say you're going to do
- Do what you say; say what you mean
- Open and honest communication
- Don't hold onto bad news
- Don't make things personal!
- Golden Rule
- Show me you're listening
- No intentional surprises
- Respect each other

Trust Building Behaviors – Group F

- Communication – two way – clear
- Timely response
- Consistency
- Do what you say – follow through
- Dependability
- Honesty
- Fair – two-way

Blames and Confessions

Industry Blames INDOT For:

- Cost pressure – sacrificing quality in order to save \$
- Fixing/assigning Gsb that may not be accurate
- Untimely/slow test results – untimely scorecard
- Slow administrative costs
- Weak specifications – can encourage lower quality in a Low Bid environment
- Reactionary (knee-jerk) specifications
- Need to strengthen specifications
- Not a timely response (test results)
- Smiling when delivering bad news
- Providing inaccurate test results
- Ambiguous specifications
- Answer is always ‘NO’
- On Time/On Budget = misunderstood/misapplied
- Lack of accurate drawings
- Too many mix-designs/contract
- Inconsistencies in pay estimates

Blames and Confessions

INDOT Blames Industry For:

- Inaccurate information/data on mixes being used
- Poor tack coat application
- Poor application of joint seal
- Over-compactive effort trying to get density
- Lack of education of field staff
- Unwilling to admit shared responsibility for problems
- Lack of implementation of Best Practices
- Managing overruns
- Lack of stewardship
- Riding the bottom of our specifications
- Tired of hearing "Your specs let us do it" or "Your specs don't require us to do it"
- Extreme number of mix designs
- Requesting exception to specifications
- Putting no relevance or trust in their own QC program
- Ignoring quality for production
- Mix changes for pay optimization
- Lack of mix designer skill/proficiency

Blames and Confessions

Industry Confesses to INDOT:

- Lack of tolerance/patience
- We ask for too much leeway
- Inconsistent quality
- We don't always follow our QCP'S
- We don't trust ourselves
- Use low quality materials and design too close to line
- Make excuses
- Not meeting INDOT metrics
- Giving them the schedule they want
- We use the Letter of the specification to justify when we know the real intent
- We give them surprises
- Excess number of mix designs
- Reducing AC content during adjustment period
- Playing with the edges of the specifications
- Not raising hand when wrong
- Expecting to make \$ on every bid item no matter if it is good or bad
- Inconsistent bid prices

Blames and Confessions

INDOT Confesses to Industry That:

- Slow to make approvals/decisions
- Waiting too long to point out errors/concerns
- Lack of education/experience
- Lack of consideration of material supply
- Expecting perfection on low budget
- Slow on test results
- Lack of adequate staff
- Sometimes too compromising – inconsistent
- Challenges of Low Bid environment
- Risk of new things – FDR, CIR
- Unexpected costs
- Lack of consistency between Districts
- Lack of active communication between OMM and Districts re: Training
- Confusing/over-complicated specifications – requiring too many designs
- We haven't encouraged proper training
- Slow response to failures, etc.
- Specifications aren't performance based

Lunch Break

- Champions Bar in Marriott Lobby (due to state ethics laws, INDOT needed separate individual checks while APAI guests were on the meeting master account).
- APAI encouraged our participants to mingle/sit with our guests to break-up clusters and this happened to a large degree.
- We kept lunch to a 45 minute time limit so as not to lose momentum.
- Comments I Overheard Included “This is the Best Meeting I Have Ever Attended.” and “Thank You for Arranging This.”

Randy West Technical Presentation

- Dr. Randy West as Director of the National Center for Asphalt Research at Auburn (NCAT) provided a 20 minute national overview of asphalt pavement performance issues that were being reported to NCAT by both public agency officials and NAPA member producers, along with various other research organizations.
- Randy also shared anecdotal comments he had received from individuals in Indiana regarding specifications. He then broke the participants into four work groups, each consisting of both INDOT and industry members. He asked them to discuss and answer three key questions:

Randy West Three Questions

- What INDOT Asphalt Specs Need to Change ASAP?
- What INDOT Asphalt Specs Need Further Research?
- What Current Specs Should NOT be Changed?

Group A

- Change ASAP: finalize IRI specs for pilot projects and said jobs; calibration
- Needs Further Research: proper application for which project certification/validation
- Do Not Change: Nothing noted

Group B (constructability table)

- Change ASAP: Reduce number of mix designs by reducing EASL categories and PG Grades from 5 to 3
- Needs Further Research: Fog seals on joints – is it working as intended?
- Do Not Change: Nothing noted

Group C

- Change ASAP: Quicker test results from area labs for acceptance; determine what is the appropriate compactive effort?
- Needs Further Research: determine what is the appropriate percentage for pay factors; determine what is the appropriate pay for tack material
- Do Not Change: Use of load transfer machine

Group D

- Change ASAP: Reweighting pay factors; Use Tracking, Eliminate Categories 1 and 5 for EASL on mix designs
- Needs Further Research: Test Strips, move to performance testing for HMA, appropriate recycle levels for RAS
- Do Not Change: Current density spec.

Open Dialogue and Partnering Discussion -- Action Plan From Larry Bonine Wrap up Session

- Joint INDOT – contractor training is critical
- Restart Quarterly Joint INDOT-APAI Technical Committee Meetings with Initial Focus on:
 - Finalize the revised IRI Spec and select pilot jobs
 - Discuss and Finalize Item 583 adjustment period
 - Review the Appeal Process – try submitting the contractor’s QC plan 1st, then OMM does the QA
 - Reduce # of mix designs by reducing PG grades and EASL categories – reduces confusion/cost
 - Make spec changes that will increase asphalt content and research HMA performance testing



Partnering Commitment Signed by All Participants and Sent by APAI to Each Attendee.

Framed copies displayed in both INDOT and APAI Executive Conference Rooms in Indianapolis.

Takeaways & Benefits From Where I Sit

- Joint Technical Committee Meetings are Occurring Once Again After Being On Hiatus for Over a Year
- Joint Training Committee Meetings To Run Indiana Certified Asphalt Technician Program & Joint Field Supervisor Certification Class.
- Both INDOT & Industry Employees Attend Both Certification Classes to Learn Side by Side.
- INDOT Again Requests Industry Input and Gives APAI a “Heads-Up” on Forthcoming Procedural Changes (i.e., Panel Participation on outsourcing of testing and acceptance by 4/6 INDOT districts).
- APAI and INDOT working together with ARA on new Pavement Designs to Get Higher Quality, Longer Lasting Pavements at Lower Cost to the Agency.

Bonus Material – 20 Steps Most Highway Construction Associations Can Take to Improve Relationships with Key Public Customers

1. Specifications Committee – joint industry technical problem solving.
2. Business Practices Committee – comprised of large company principals and senior DOT staff. Devoted to resolving non-specification issues impacting industry; everything from DBE regs and weather delays, to claims and contract language, and to workforce development and dealing with EPA stormwater rules.
3. Contractors Joint Policy Committee (CJPC) – Create an umbrella industry organization consisting of bridge contractors, grading contractors, asphalt pavers, concrete pavers and limestone producers. Input on contract matters, lettings and has joint meetings with senior DOT staff. Partnering with other industry groups to speak with one, united voice to legislature and media.

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4. Industry and DOT discuss their respective legislative agenda's prior to any legislation session in private meetings. Any points that may conflict are worked out prior to the session, not aired in public.
5. Form an association coalition which actively lobbies DOT's agenda, both policy and budget issues. The coalition's goal is Long-term, Dedicated, Stable, and Adequate Funding for the state's highway infrastructure.
6. The association coalition lobbyist and DOT lobbyist confer daily during the session and often make joint contacts of legislators, both at the Statehouse and in Congress in Washington, DC. This "Team Approach" sends a powerful communications message to elected officials.

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7. The Association coalition serves as a buffer for DOT against groups opposing DOT legislative agenda. Again, we are all on the same team regarding funding.
8. Associations should proactively offer help and resources to assist DOT in downsizing efforts to allow additional funding for new highway construction and outsourcing of required system maintenance to the industry.
9. Associations and DOTs should jointly sponsor meetings for Chambers of Commerce and other pro-highway advocacy groups regarding federal re-authorization process, including joint fly-ins to Washington/Ottawa or visits to state/provincial capitals.
10. Associations and DOTs should conduct joint annual press conferences regarding kick-off of construction season focusing on safety and the many economic benefits of highway construction investment by the state.

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11. The Association safety committee and DOT counterparts should meet frequently regarding new safety initiatives and joint efforts to build awareness via public education and social media.
12. Associations could consider the creation of an annual recognition at their state convention of an “Outstanding Public Sector Employee” award to shine the industry spotlight on a deserving state employee who goes well beyond the job description in his or her efforts to further the effectiveness and spirit of the DOT/Industry Partnership. Nurture more true believers!
13. Associations can and should collaborate and communicate regularly with state and DOT truck and weight regulators and enforcement personnel regarding construction trucks and materials. Collaboration has led to many improved and updated truck laws that balance cost-efficiency and safety for the benefit of both the agency, industry, and traveling public.

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14. Association and DOT personnel collaborate on DOT contractor training and certification programs for industry employees administered by industry associations to improve quality. Industry employees and DOT employees learn best side by side in the same room at the same time from peers.
15. DOTs should accept input from associations on how to create more effective DBE programs to achieve greater ROI on earmarked funding and graduate contractors from that program once milestones are achieved.
16. Associations and DOTs can and should work together with local public agencies under the LTAP umbrella to develop rules regarding construct by contract and lessen government self-performance of construction work.
17. Associations and DOTs can work together to host meetings with utility companies to facilitate more effective and timely utility relocation work.

Bonus Material – 20 Steps Most Highway Construction Associations Can Take to Improve Relationships with Key Public Customers

18. Associations and DOTs can jointly develop various quality initiatives and awards programs to recognize and incentivize contractor achievements.

19. Associations should get involved with national AASHTO by encouraging member firms and key staff to attend regional meeting AASHTO meetings.

20. Associations should invite state/provincial DOT staff to play a prominent role not only in presenting at their annual meetings but in planning the program; and encouraging as many DOT employees to attend as guests of the association as possible. This also increases contractor attendance. Which in turn increases exhibit booth sales and sponsorship revenue.

Thank you.

Kirsten Pauley, PE, Technical Director
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