Best Practices for Commercial and Industrial Parking Lots

2019 63rd Annual Asphalt Paving Conference

APAM

Dan Staebell
Asphalt Pavement Alliance
Northcentral Regional Director
dstaebell@asphaltroads.org
608-440-0142 Cell

Research & Technology

Market Research & Communications

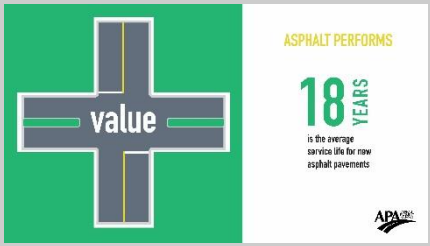
Deployment Activities

Pavement Economics Committee
- 4 Task Groups

Other Research
- Asphalt Institute
- NCAT

Future Research

Go-To-Market Task Group



Deployment Task Group

APA ASPHALT PAVEMENT ALLIANCE

NAPA NATIONAL ASPHALT PAVEMENT ASSOCIATION

SAPA State Asphalt Pavement Associations

ASPHALT INSTITUTE

ASPHALT PAVEMENT ALLIANCE

To establish asphalt pavement as the preferred choice for quality, performance and the environment.

Mission

Total Tons

Table 3: Summary of 2017 Estimated and Reported Asphalt Mixture Tons in Each State

State	Tons, Millions Estimated	Tons, Millions Reported	Reported % of Estimated	State	Tons, Millions Estimated	Tons, Millions Reported	Reported % of Estimated
Alabama	7.0	4.9	70%	Montana	4.2	*	*
Alaska	5.1	*	*	Nebraska	2.8	0.5	18%
American Samoa	0.03	*	*	Nevada	3.4	1.3	38%
Arizona	6.5	1.2	18%	New Hampshire	3.0	2.5	83%
Arkansas	6.0	1.9	32%	New Jersey	10.2	4.0	39%
California	26.0	5.9	23%	New Mexico	3.0	0.9	30%
Colorado	5.3	2.0	38%	New York	16.5	7.3	44%
Connecticut	4.9	2.8	57%	North Carolina	16.0	6.4	40%
Delaware	1.5	*	*	North Dakota	2.7	1.2	44%
District of Columbia	1.4	*	*	Ohio	14.8	11.6	78%
Florida	16.5	4.6	28%	Oklahoma	4.8	2.4	50%
Georgia	14.6	2.2	15%	Oregon	5.4	1.4	26%
Hawaii	1.1	0.8	73%	Pennsylvania	19.8	7.7	39%
Idaho	2.8	1.7	61%	Puerto Rico	1.6	NCR	NCR
Illinois	13.0	2.1	16%	Rhode Island	2.0	*	*
Indiana	11.8	6.6	56%	South Carolina	7.6	3.9	51%
Iowa	3.9	1.6	41%	South Dakota	2.0	*	*
Kansas	2.0	1.1	55%	Tennessee	9.2	2.5	27%
Kentucky	4.4	4.4	100%	Texas	20.0	7.9	40%
Louisiana	7.8	1.2	15%	Utah	4.0	3.5	88%
Maine	1.7	2.0	118%	Vermont	1.9	*	*
Maryland	7.8	2.4	31%	Virginia	12.0	4.9	41%
Massachusetts	6.5	5.0	77%	Washington	6.0	4.5	75%
Michigan	13.7	9.0	66%	West Virginia	2.6	1.5	58%
Minnesota	6.9	6.0	87%	Wisconsin	12.0	8.7	73%
Mississippi	4.8	2.8	58%	Wyoming	2.5	0.1	4%
Missouri	6.5	3.9	60%	Total	379.4	163.0†	43%

NCR No Companies Responding
* Fewer than 3 Companies Reporting
† Total Reported Tons includes values from state with fewer than 3 Companies Reporting
SAPA Estimated Tons
Numbers do not add up exactly due to rounding

Asphalt Pavement Industry Survey on Recycled Materials and Warm-Mix Asphalt Usage 2017
Information Series 138

Commercial Tons

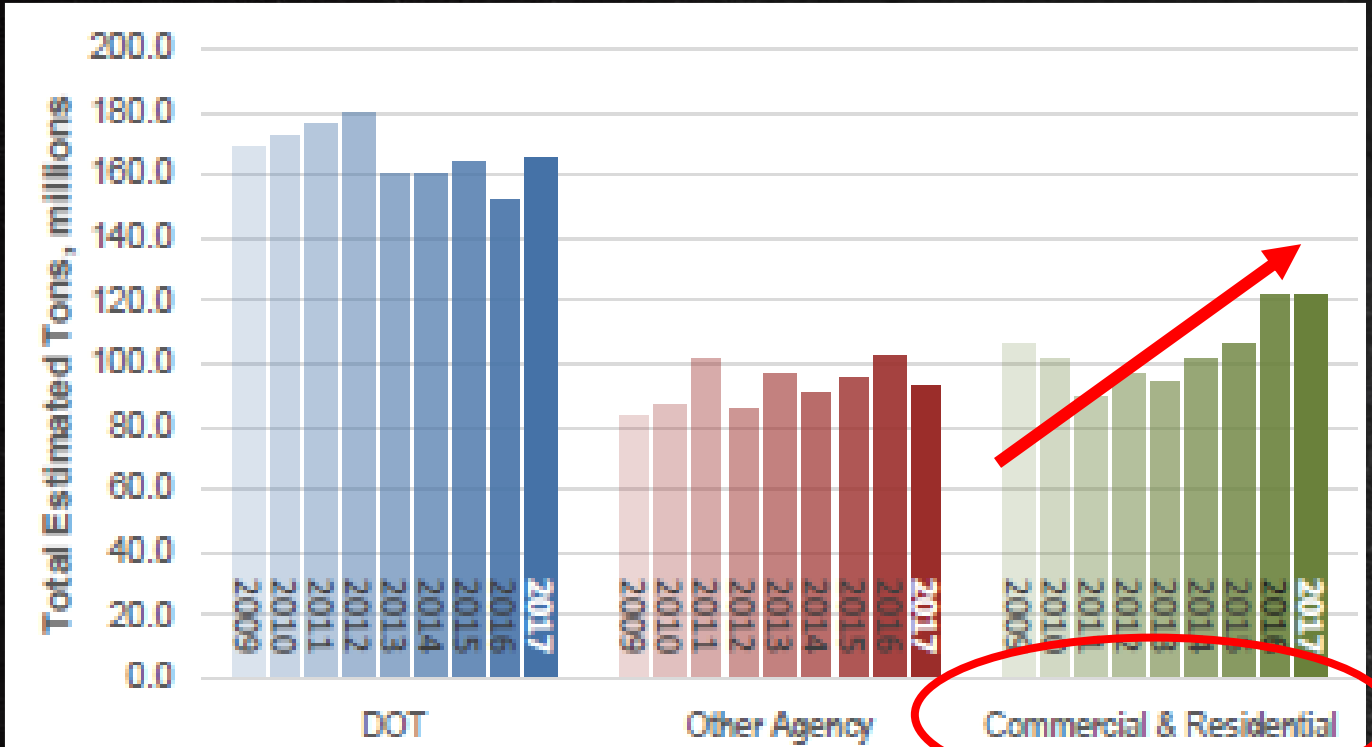


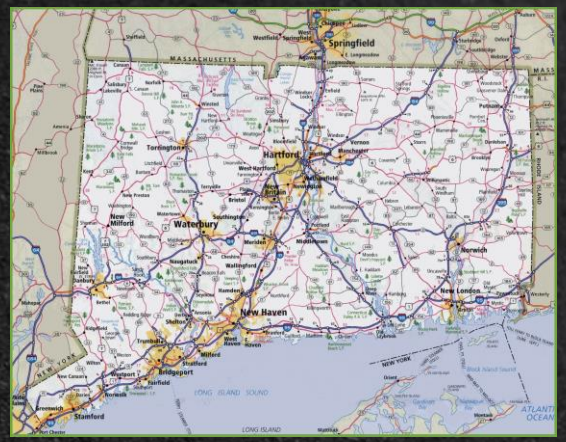
Figure 2: Estimated Total HMA/WMA Asphalt Mixture Production by Sector, 2009–2017

Asphalt Pavement Industry Survey on Recycled Materials and Warm-Mix Asphalt Usage 2017

Information Series 138

Big NEED

- As of 2015, the Bureau of Transportation Statistics estimates that there are over 250 million registered light vehicles (car, light trucks and motorcycles) in the United States. While estimates of parking totals have varied, most studies conclude that we have between 4 and 8 parking spaces per vehicles in this country. Perhaps that number isn't terribly surprising. After all, we park our cars at home, at work, at church, at the shopping mall, etc. But combined, that means we have between 1 billion and 2 billion parking spaces in America alone.
- Billions of parking spaces is a lot, but it can be tough to wrap your head around that number. So, if we were to build 1 billion parking spaces side by side, it would cover an area equivalent to the size of Connecticut…..



https://av-future.com/impact/parking/

Have you ever heard this?

It's just a parking lot!

Asphalt. AMERICA RIDES ON US

APA ASPHALT PAVEMENT ALLIANCE

7 Keys

Handout

- Pick your Mix
- Dig Deep
- Drain the Rain
- Build a Base
- Trucking Along
- The Green Scene
- Pave and Save

Pay attention to details

Asphalt. AMERICA RIDES ON US

APA ASPHALT PAVEMENT ALLIANCE

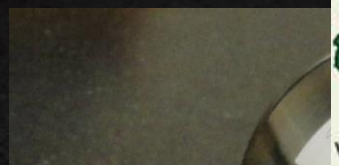
Pick your Mix

- Parking vs. Highway
  - Static
  - Rolling

The Glue that Binds!

- Asphalt Cement Binder - **Important**
  - What is PG
  - What grade and Where?

Viscoelastic = Materials that are time and temperature susceptible.



WAPA
WISCONSIN ASPHALT PAVEMENT ASSOCIATION

2018 ASPHALT PARKING LOT DESIGN GUIDE — CHAPTER 3 — CONSTRUCTION

Table 3.1. Pavement Thickness for Traffic Class I

20-Year Design ESALs	Typical Use	Asphalt Mixture Type	Subgrade Type		Asphalt with Crushed Aggregate Base		Recommended Surface Layer PG Binder Designation
			Rating	Description	Total Asphalt Thickness (in.)	Base Thickness (in.) [2]	
< 2 million	Residential driveways School and recreational areas Playgrounds and tracks Bike paths Sidewalks **Parking lots (<50 stalls)**	LT	Good-to-excellent	Gravels and coarse sands. SSV ≥ 5.0	3.0	6.0 – 8.0	S
			Medium	Clays and silts with low plasticity. SSV = 4.0 - 4.9.	3.5	6.0 – 10.0	S
			Poor	Clays and silts with high plasticity; sugary (incompactable) sands. SSV = 2.5 - 3.9.	4.0	9.0 – 12.0	S

Table 3.2. Pavement Thickness for Traffic Class II

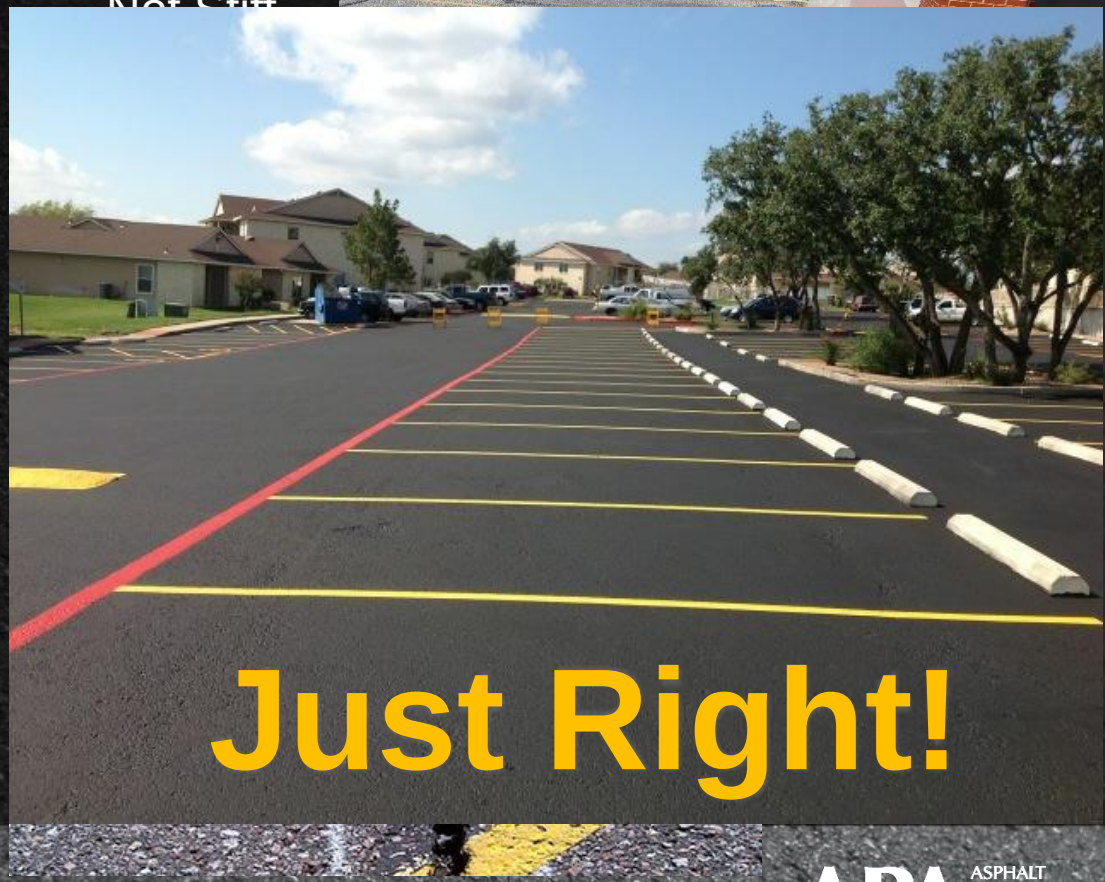
20-Year Design ESALs	Typical Use	Asphalt Mixture Type	Subgrade Type		Asphalt with Crushed Aggregate Base		Recommended Surface Layer PG Binder Designation
			Rating	Description	Total Asphalt Thickness (in.)	Base Thickness (in.) [2]	
< 2 million	Low-volume roadways Subdivision streets Collector streets Town roads County roads **Parking lots (≥50 stalls)**	LT	Good-to-excellent	Gravels and coarse sands. SSV ≥ 5.0	3.0 – 3.5	6.0 – 10.0	S or H
			Medium	Clays and silts with low plasticity. SSV = 4.0 - 4.9.	3.5 – 4.0	6.0 – 12.0	S or H
			Poor	Clays and silts with high plasticity; sugary (incompactable) sands. SSV = 2.5 - 3.9.	4.0 – 4.5	9.0 – 14.0	S or H

[1], [2]. Because a parking lot asphalt pavement is likely to be re-constructed in the future without replacing the base, it may be desirable to use a thicker base course than those specified here. Consider adding up to four inches when considering base thickness for parking lot pavements.

Pick your Mix

- Understand Asphalt Cement – Binder
  - Proper % Binder
  - Performance Grade (PG)
  - Ask for guidance!
    - Physical Location of Use
    - Base or Surface
    - Polymer additives
- ***Warning:*** Improper Selection can result in:

Not Stiff



Mix Targets

- Start with trials to learn best fit.
- Learn from variations
- Monitor and QC Checks

Typical AC Values @ 4% Air Voids

NMAS	VMA	0% ABS	1% ABS	2% ABS
9.5mm (3/8”)	15.5	5.0%	5.6%	6.2%
12.5 mm (1/2”)	14.5	4.6%	5.2%	5.8%
19mm (3/4”)	13.5	4.2%	4.8%	5.4%

Add 0.2% to above AC values to achieve 3.5% Air.

- Possible use in lower lifts.
- Surface = Performance testing?

Rap Percent Use

- Manage Percentage
- Liquid Binder
- Mix Design = Performance

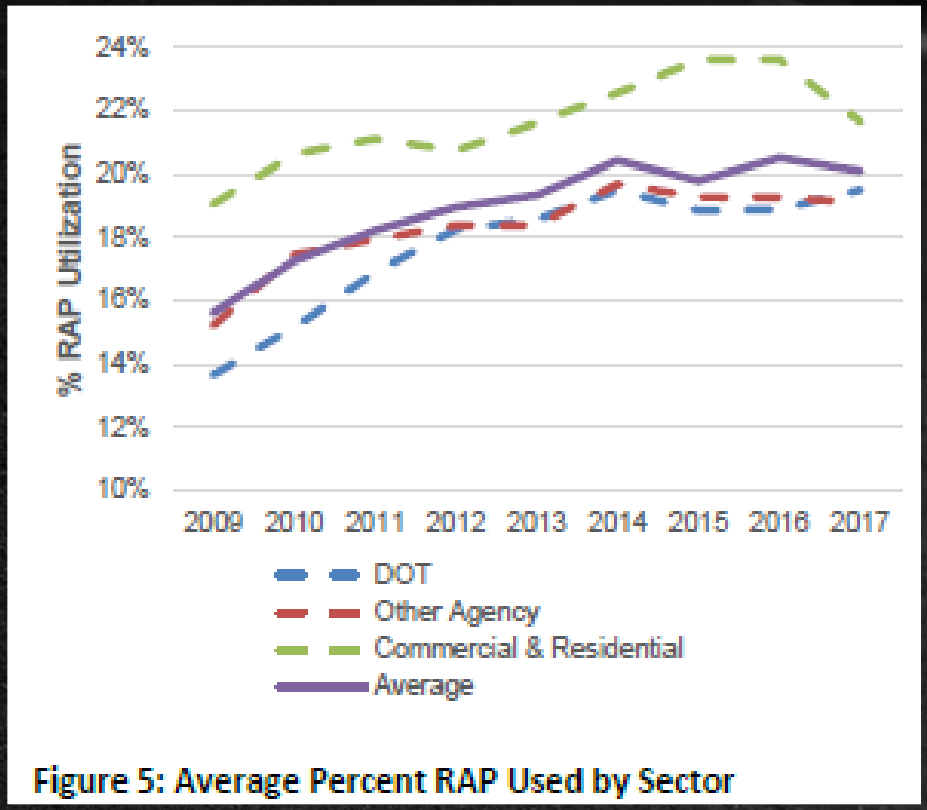
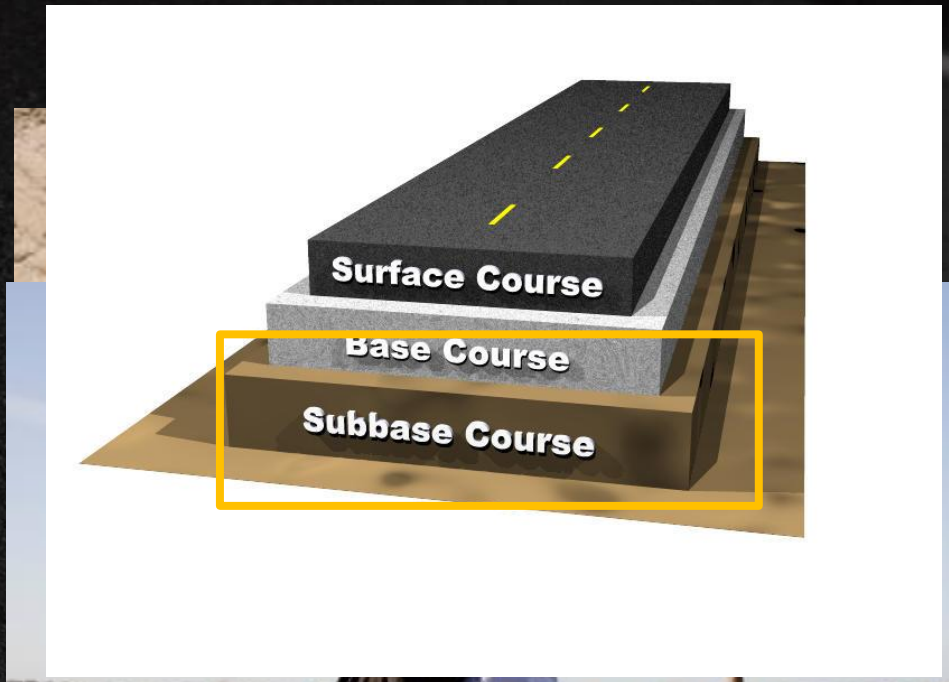


Figure 5: Average Percent RAP Used by Sector

Dig Deep

- Subbase Platform
  - Understanding Support = Critical Part of Design
  - Investigate



Drain the Rain

- Moisture Bad
  - Subgrade
  - Surface >1%
- Drainage System
- *"Pay me now or P… me later"*
- *Success starts fr… the ground up!*

Build A Base

- Structural Platform
- Paving Platform
- Type and Technique

Critical Pavement Design Loading and Pavement ESAL's

Trucking Along

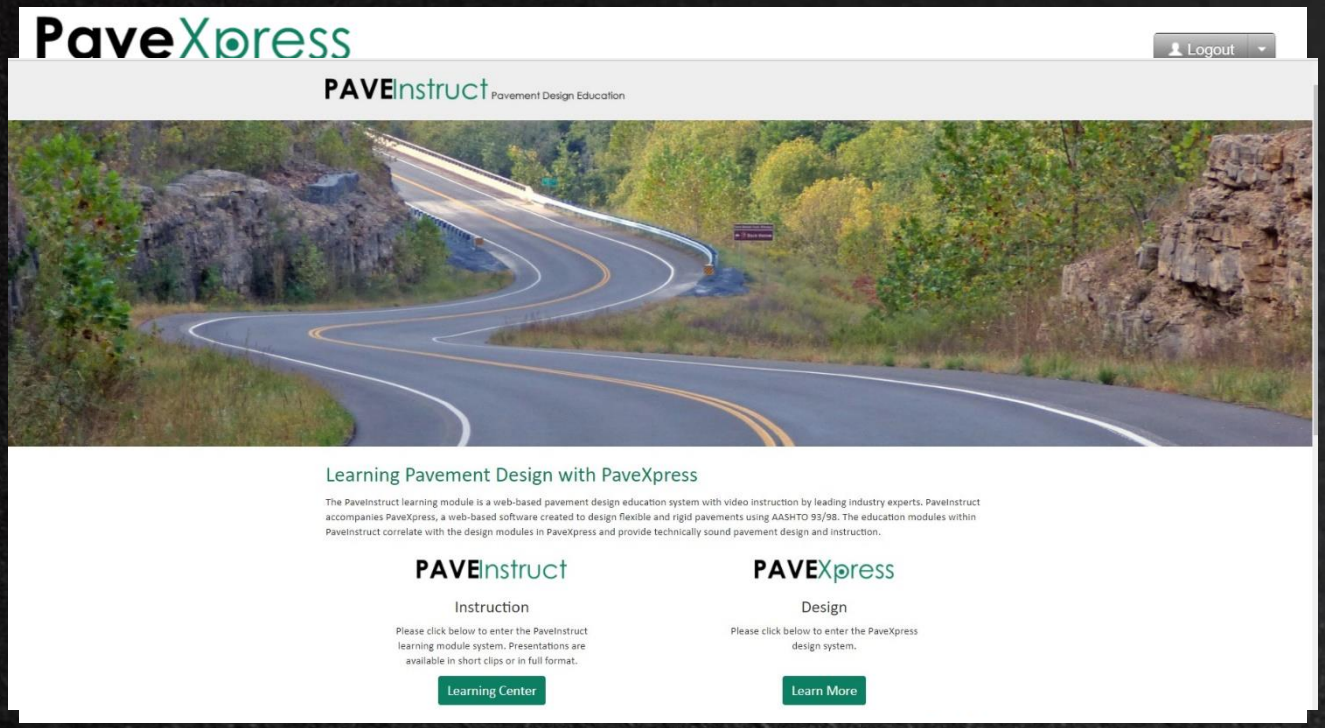
- Nothing Temporary-Plan and design for the long term…
- 1 Loaded Semi = 3000 Cars
  - ESAL Calculation Pavement Interactive
- Cars Minimal Impact –
  - Design Minimum (See SAPA)

Thickness Design Guides

PaveXpress

A Simplified Pavement Design Tool

PaveXpressdesign.com

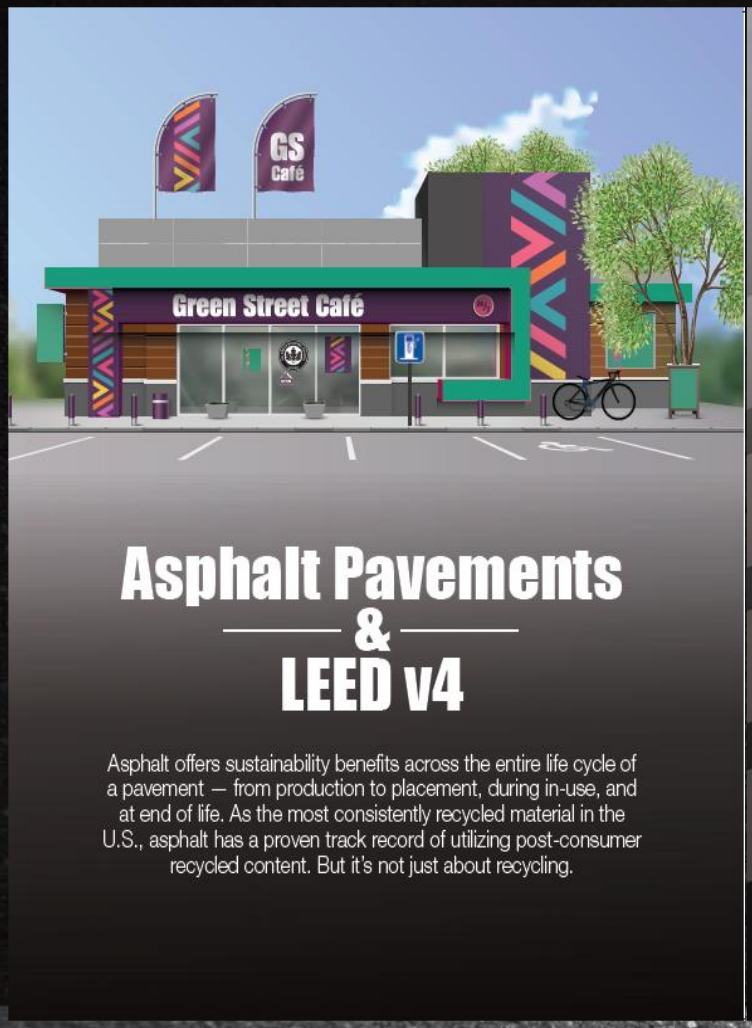


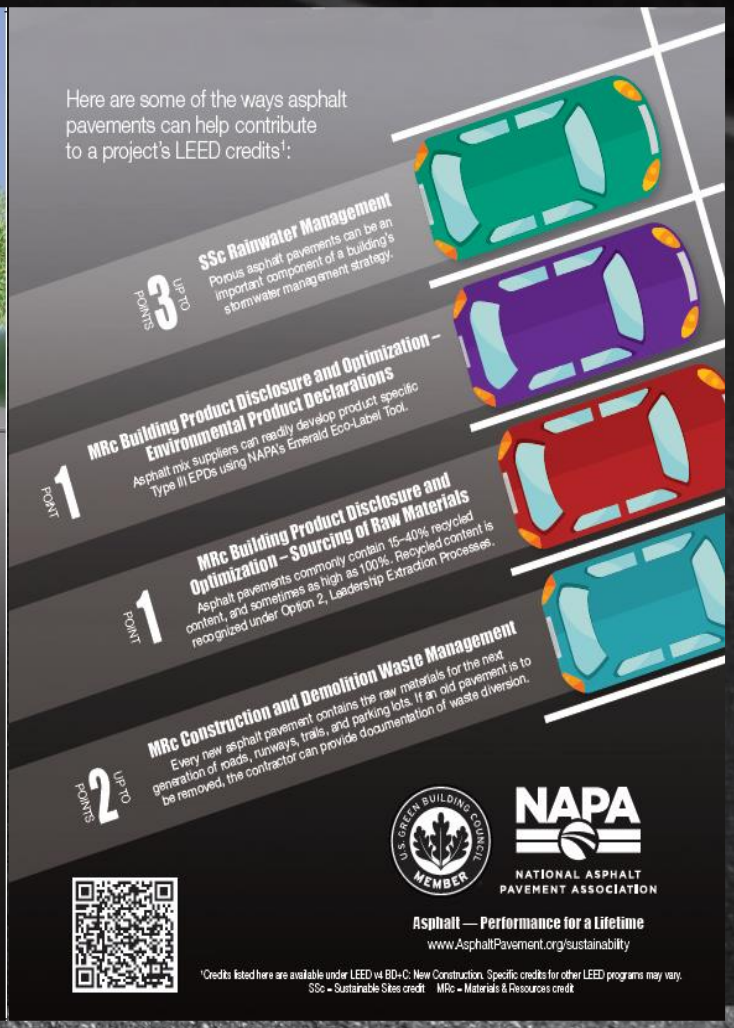
The Green Scene

- Asphalt Pavement #1 Recycled Material
- RAP = Recycle Asphalt Pavement
  - Resources Saved / 100% Reusable
    - Aggregate
    - Binder
- LEED v4
- EPD's = Environmental Product Declarations

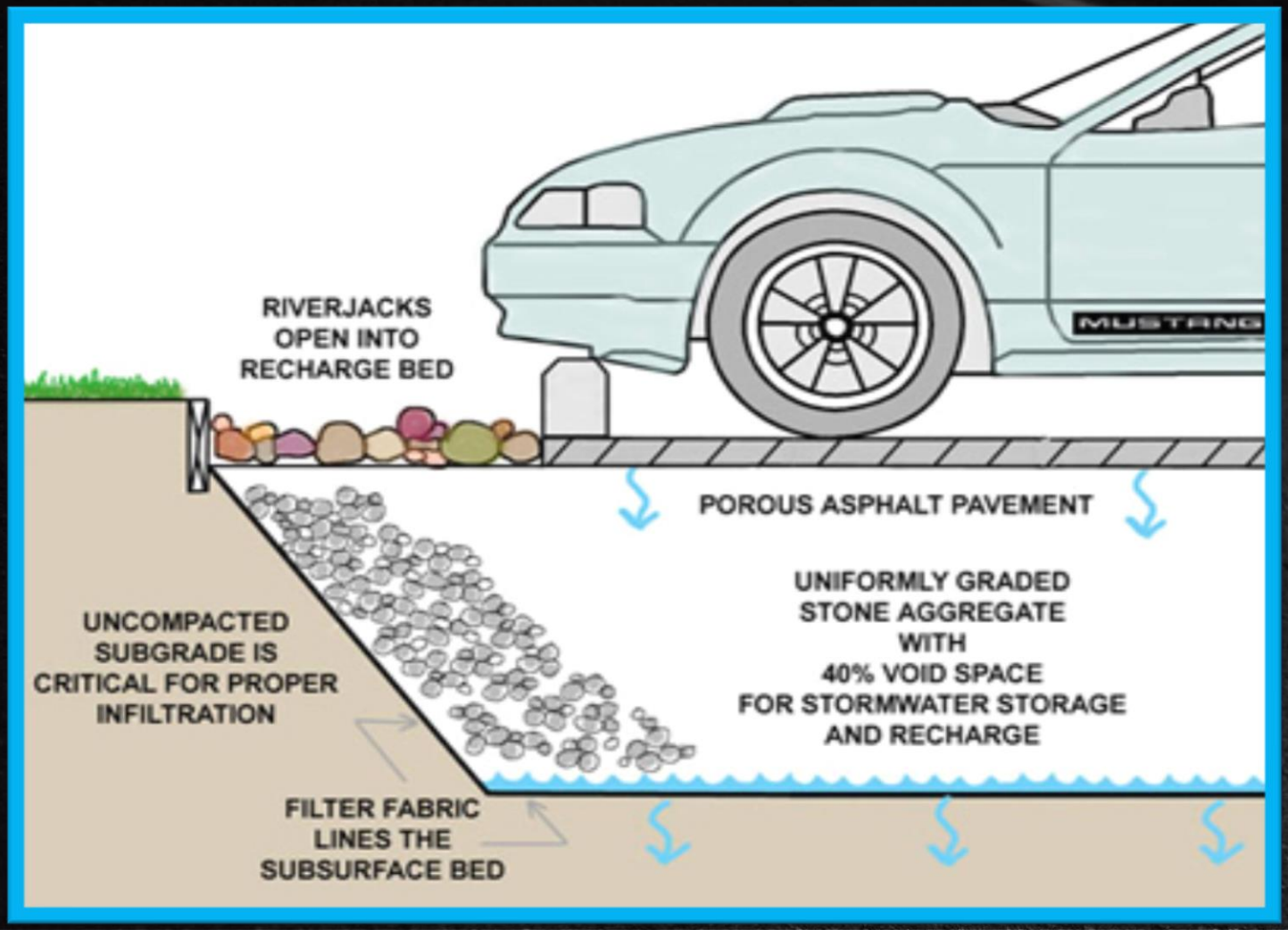
LEEDv4 USGBC

- 1-3 Points
- Recycle
- Storm Water
- EPD's





Porous Pavement



Porous Pavement

Asphalt. AMERICA RIDES ON US

https://youtu.be/_-5S9LIyYvQ

APA ASPHALT PAVEMENT ALLIANCE


Pave and Save

Pave and Save

- Select Qualified Contractor
  - SAPA List
- Inspect – Inspect – Inspect
  - Oversight = Sleep like a baby!
- Ask Questions

Handy Checklist

Checklist for Parking Lots

To achieve the longest life, lowest maintenance costs, and best performance from an asphalt parking lot, the entire construction process should be monitored for the quality of both its materials and workmanship. It is important in case of claims that the parking lot be photographed before, during, and after construction. A new parking lot project begins with a subgrade of compacted soil and the base layers and continues through the paving process. The following checklist is designed to help the onsite inspector or owner's representative identify key aspects of the process and understand best practices known to produce a quality pavement project. The checklist is based upon national recommendations, local climate, materials, and practices.

Project Review

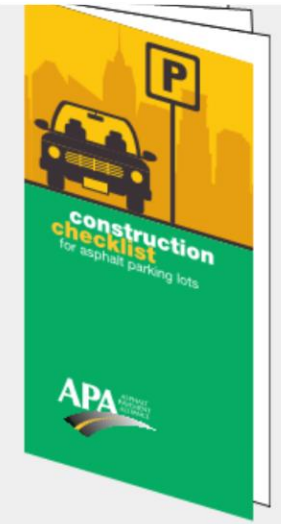
Every paving project should start with a detailed review of the project's contract, plans, and specifications. Any questions arising from this rev
to the design firm's

Asphalt Mixture

Prior to starting this project, the design engineers determined the depth of each pavement layer and the type of asphalt mixture to be used. Your responsibility is to verify that the correct, specified asphalt mixtures are coming to the site. You can check and collect the truck delivery tickets to verify and document asphalt type and tonnage arriving on the project.

Ask Yourself –

- ☐ Is this the correct mix type for the project and the layer you are constructing?
- ☐ Is the mix type specified being installed at the minimum lift thickness?
- ☐ Does the truck delivery ticket match the approved mix design?
- ☐ How many tons are estimated to pave the project?
- ☐ Does the paving foreman know how many tons he expects to use?
- ☐ How many dump trucks are scheduled to deliver the mix from the plant and how many tons are in each round?
  - The goal is to balance the mix delivery schedule to avoid having to start and stop the paving operation.
- ☐ Are there enough trucks on the run to haul the mix needed to complete the job?
  - If you have 5 trucks on the round each carrying 25 tons = 125 tons per round.
  - If each round takes 1 hour to make, then the production rate is 125 tons per hour.
  - If the job requires 1,000 tons at 125 tons per hour = 8 hours to get the mix to the job.
- ☐ Are the truck bodies cleaned of debris and are they tarped when they arrive on site?
- ☐ Is an approved release agent being used? **DIESEL FUEL is not allowed!**
- ☐ Is the temperature of the mix arriving at the site within the project guidelines?



Contact us today
for your free copy of
Construction Checklist

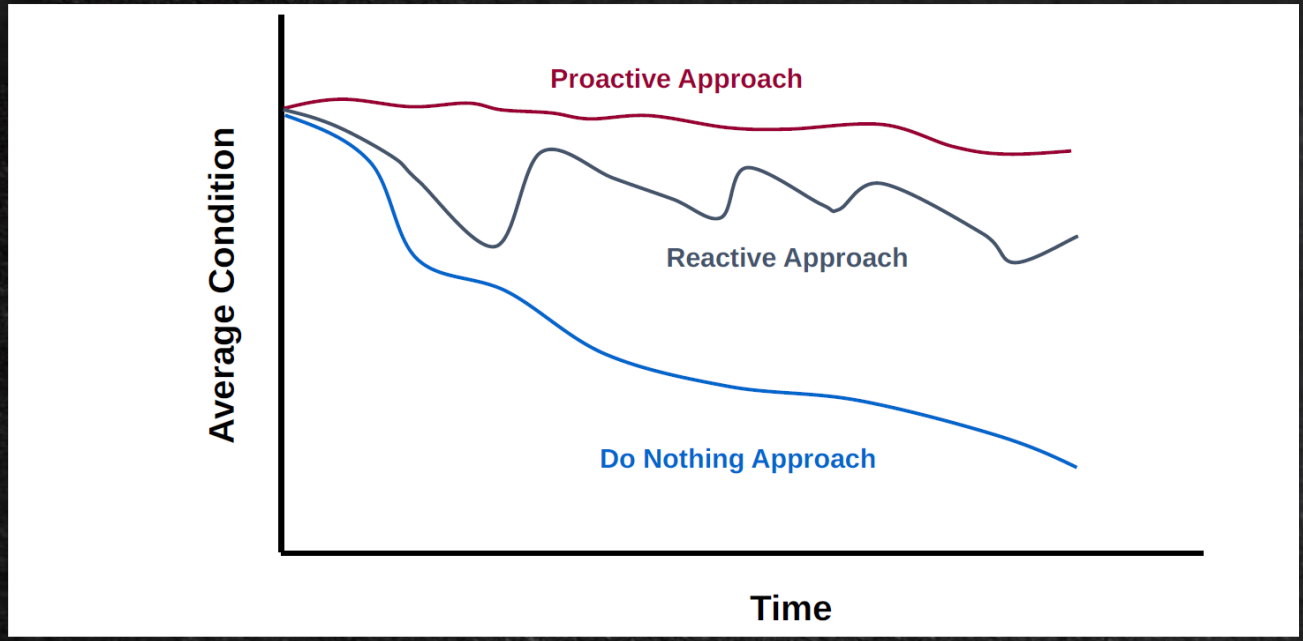
Recap

- Pick your Mix
- Dig Deep
- Drain the Rain
- Build a Base
- Trucking Along
- The Green Scene
- Pave and Save

Pay attention to details

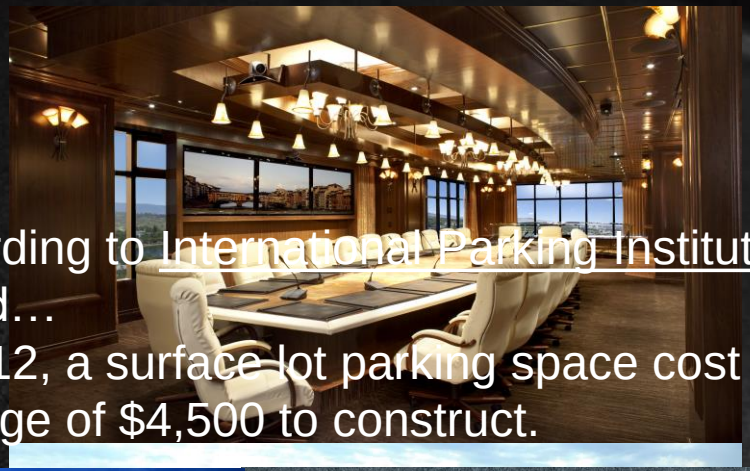
Property Investment – Value

Which Approach?

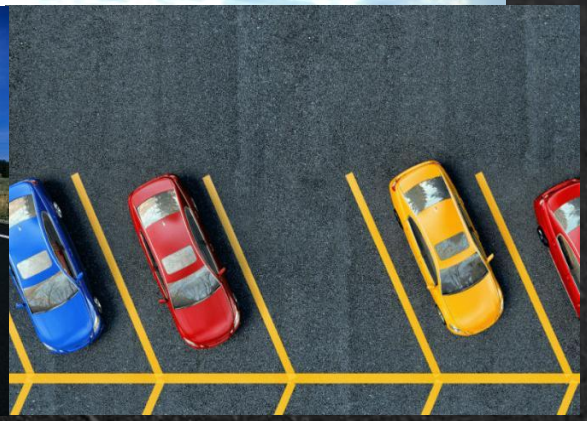


Property Investment Strategy

- Undervalued Asset
- Define Asset Value
- Parking Lots vs Roadways

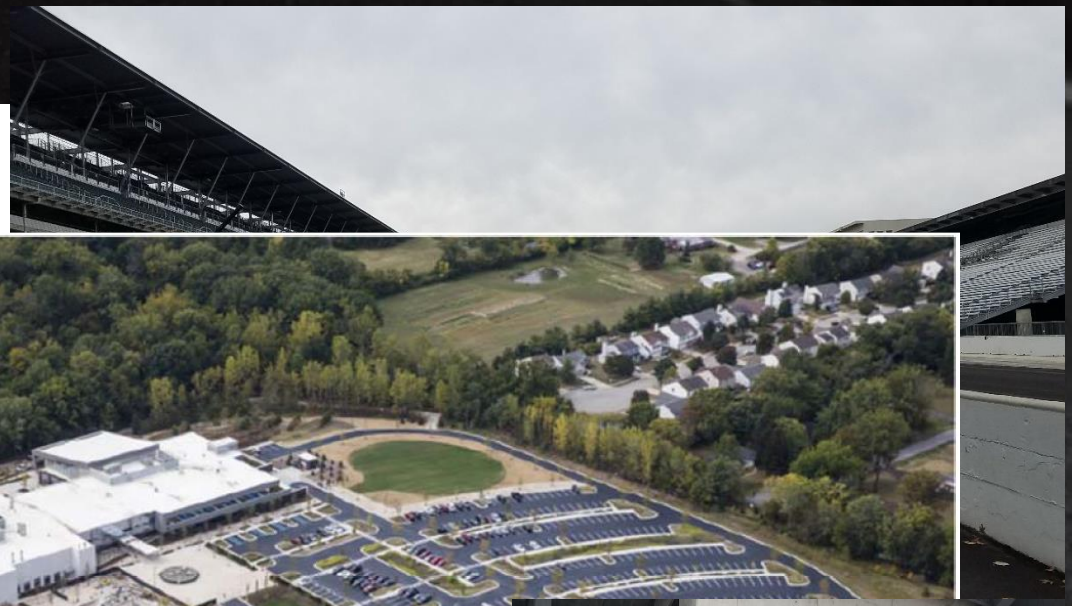


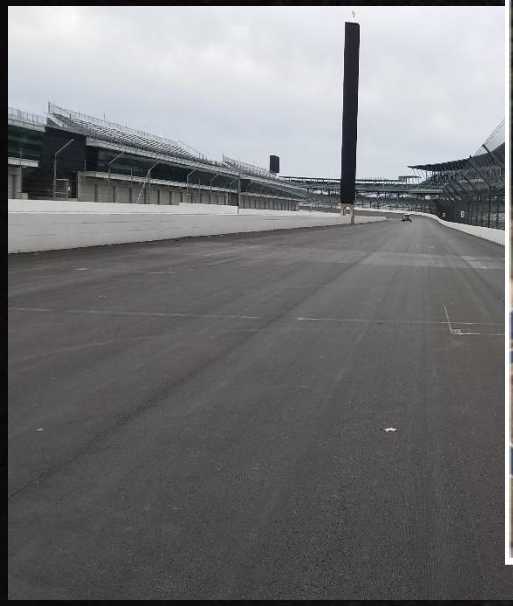
According to International Parking Institute stated…
In 2012, a surface lot parking space cost an average of $4,500 to construct.



What Lies Ahead – Techniques

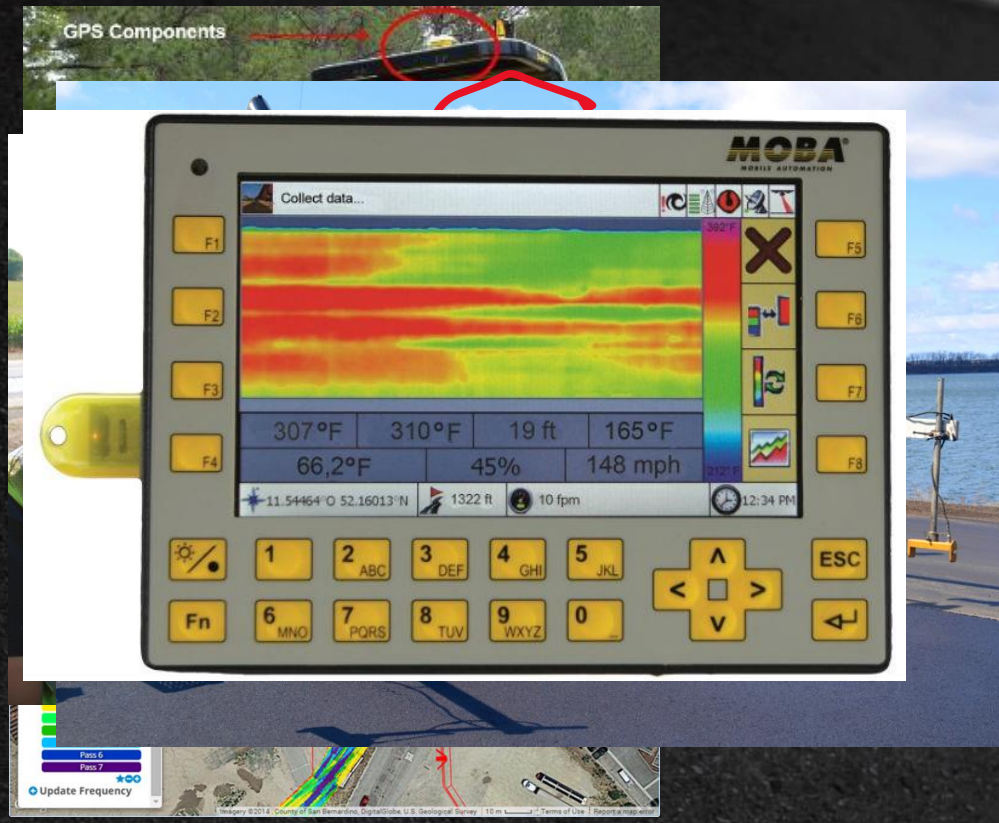
- Joint Construction





What Lies Ahead – Equipment

- Joint Construction
- Intelligent Compaction
- Temperature Monitor

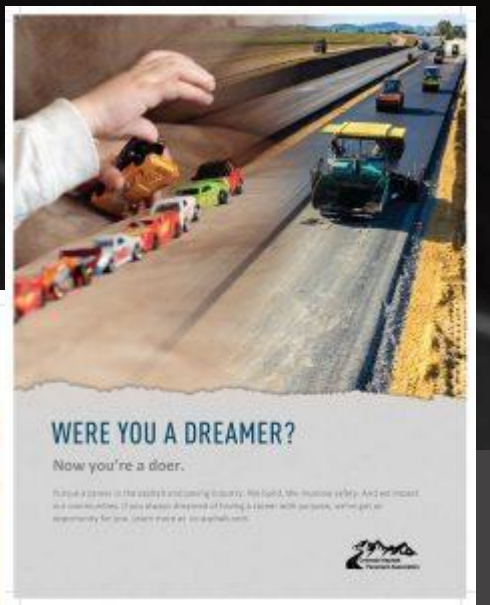


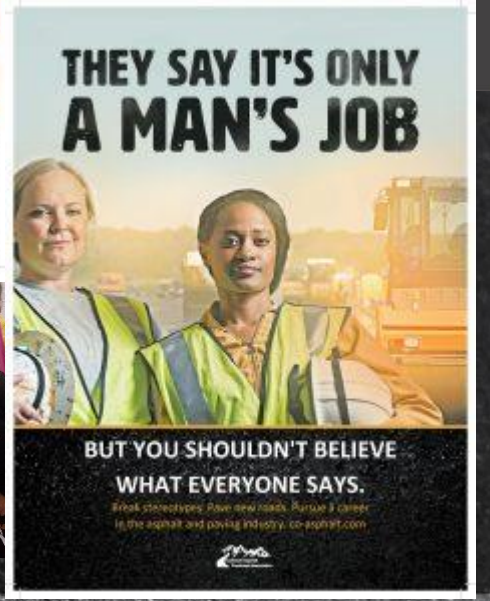
What Lies Ahead- Facilities

- Owners & Developers
  - Online Shopping
    - Heavy Duty Paving-Key
  - Repurpose Buildings
    - Repurpose Parking Lot
    - Adaptability – Flexible - Recycle

What Lies Ahead

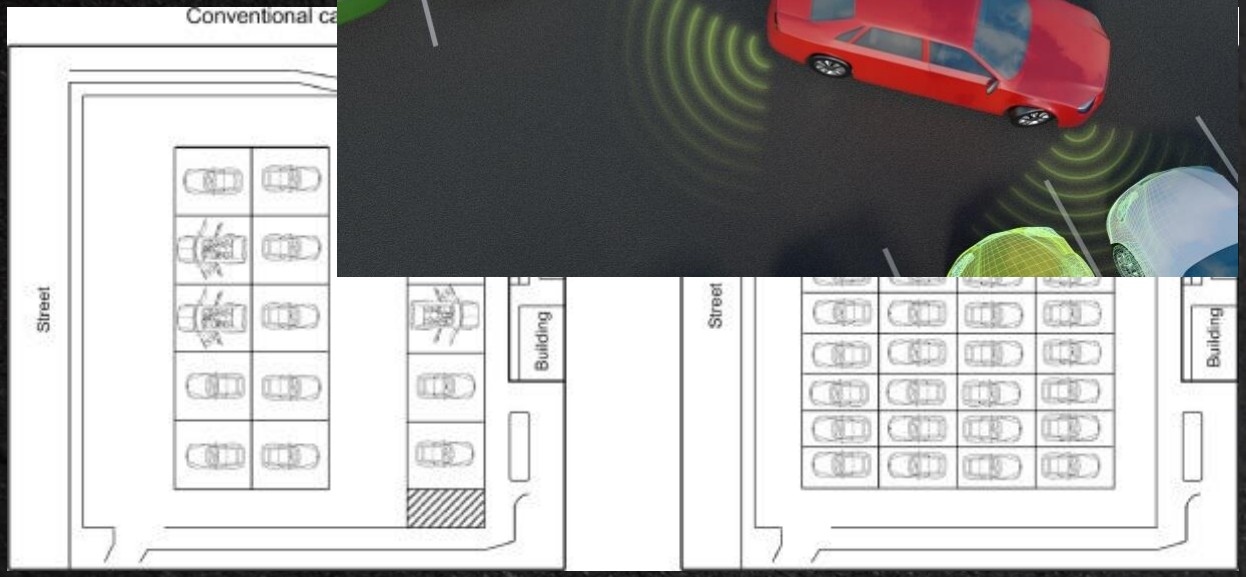
- Construction Industry
  - Workforce Development
    - WOA
    - FFA
    - Millennials/Gamers





What Lies Ahead

- Vehicle Changes
  - Electric Vehicles
  - Autonomous Vehicles
    - Cars
    - Trucks



Who Are the Primary Players Behind Next-gen Transportation?

Include:

- Amazon
- Intel
- Tesla
- Google
- Uber
- Lyft

amazon

TESLA

Google

UBER

lyft

APTIV

MY POINT – What Lies Ahead!

Build for Today with your EYE on Tomorrow!

- Build Flexible
- Watch for Change
- Understand Performance
- Seek Knowledge
- Look for Information
- Ask Questions

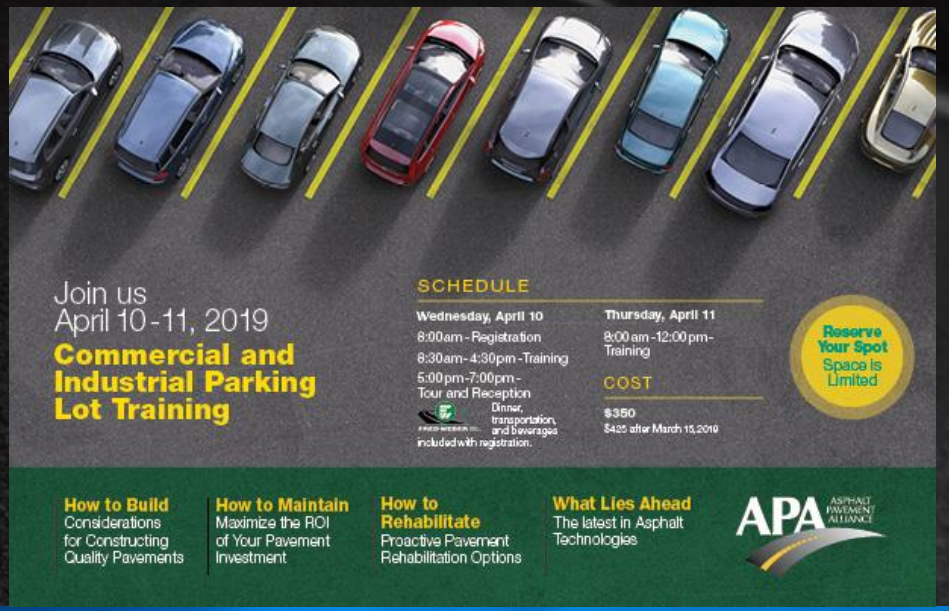
Which One?

Asphalt Benefits

- Versatile
- Adaptable to change
- Fast
- Smooth
- Atheistically pleasing
- Durable
- Rehabilitation Option!

Close Out - Final

- Remember the Keys
- Lessons Learned
  - ***It IS a Parking Lot***



- St Louis, April 10th and 11th

Be Safe & Thank You!

Dan Staebell
APA
Northcentral Regional Director
dstaebell@asphaltroads.org
608-440-0142 Cell