CalRecycle/CIWMB Support of Rubberized Asphalt Concrete (RAC)
Rubberized Asphalt Concrete (RAC) has been a tire diversion strategy used by CalRecycle/CIWMB since the very beginning of the Tire Program.

The use of RAC by State and Local Government Agencies currently diverts over five million waste tires per year from landfill disposal in California.

Over the past twenty years of the Tire program, RAC has diverted an estimated ____ million waste tires.
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The use of RAC by State and Local Government Agencies currently diverts over five million waste tires per year from landfill disposal in California.

Over the past twenty years of the Tire program, RAC has diverted an estimated 68 million waste tires.
What is RAC?

For the purposes of this discussion, RAC is any paving material that contains liquid paving asphalt, rubber and aggregates used in chip seal or overlay applications.
What is RAC?

- Asphalt-Rubber – Developed in Arizona in the late 1960’s and has 35 years of use in CA.

- Terminal Blend – Developed in the mid-1980’s in TX and FL. Used in CA since the late 1990’s.
RAC has proven to be a cost effective, superior performing product compared to conventional AC. CalRecycle staff and management recommend its use when appropriate for the situation.
Overview of Support

- Caltrans
- Local Government
  - Technology Centers
  - Contracted Experts
- Research Contracts
- Grants
Caltrans-CalRecycle Collaborations
Caltrans-CalRecycle Collaborations

- Technical Research Interagency Agreements
  - 1992-Lab Test Equip & Air Monitoring
  - 2003-State of the Art & Recycling

- Construction Projects
  - 1993 Maintenance Project – Hwy 16
  - 2002 Overlay Project – Hwy 33
Caltrans-CalRecycle Collaborations

1992-Lab Test Equip & Air Monitoring

• Dynamic Shear Rheometer
• Universal Testing Machine
• Air Emissions Testing and Monitoring
Caltrans-CalRecycle Collaborations

2003-State of the Art & Recycling

- Evaluate and update Caltrans lab and field processes and test methods
- Developed the AR Usage Guidelines
- Technology Transfer to all Caltrans Districts
1993 Maintenance Project – Hwy 16

- 14 Different Maintenance Strategies RAC materials
- Field Constructed Research
- Incorporated in the Caltrans Maintenance Technical Advisory Guide
2002 Overlay Project – Hwy 33 Firebaugh, CA

- Field Constructed Research
- Direct comparison of AR, TB, Dry and conventional AC material performance at full and half thickness
RAC Technology Centers
RAC Technology Centers

• CIWMB partnered with Los Angeles County DPW in 1997 to create the first center

• The center was created to promote the use of RAC by local governments via peer to peer

• The center provided RAC technology transfer, maintained a website and toll-free hotline
RAC Technology Centers

- Conducted construction inspection workshops
- Provided grants for deflection testing and Quality Assurance/Quality Control (QA/QC)
- Partnered with Sacramento County in 2000 to provide services in Northern California
RAC Expert Contracts
RAC Expert Contracts

• New way to deliver RAC technology transfer
• Direct technical support of our expanding RAC grant programs
• Engineering Evaluation and design assistance
• Increased field support of grantees
• Technical Investigations
RAC Expert Contracts

- 2005 - MACTEC Engineering and Consulting
- 2009 – Jacobs Engineering
- 2012 – Quincy Engineering Inc.
RAC Research Contracts
Research Contracts

• Use contracts to fill in gaps in knowledge base, determine feasibility of technology, investigate new processes and materials

• Partner with entities that have a proven expertise and record of accomplishment with RAC projects and/or research.
Past Research Contracts

- Terminal Blend Chip Seal Demonstration Project
- Terminal Blend and Warm Mix Asphalt Evaluation
- Life Cycle Cost Analysis (LCCA) for RAC materials
- Warm Mix Asphalt Performance Evaluation
Research Contracts

Current Contracts

- Reclaimed Asphalt Pavement (RAP) in Chip Seal and RAC Hot Mix Demonstration Project
- Warm Mix Asphalt Technology Evaluation
- RAC Performance Models Development
Grants
Grants

- Provided Grants for RAC since the beginning of the Tire Program

- Awarded over $55M in the last 10 years
  - $40.5M for overlay projects
  - $14.5M for chip seal projects
Why CalRecycle Will Continue to Support RAC

- Largest recycling use of waste tire rubber
- Demonstrated superior performance of RAC over conventional asphalt concrete (AC). Long-lasting durability; Resists reflective cracking
- Shown to be a cost effective resurfacing option over conventional AC
Questions?