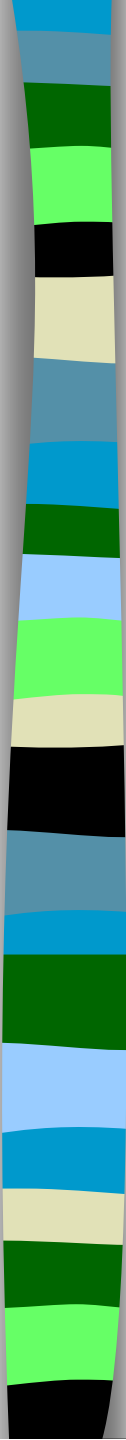




**SOLUTIONS FOR  
YOUR ENVIRONMENT®**





# **Reducing the Number of Asphalt Mixture Testing Disputes – The Michigan Solution**

**Tom Blair**

**Director of Product Engineering**

**Asphalt Group**

**Edw. C. Levy Co.**

**Asphalt Industry Forum – Technical Meeting**

**Denver, Colorado**

**May 7, 2014**



# About the Edw. C. Levy Co.

Founded: 1918

Size: 1,400+ Employees

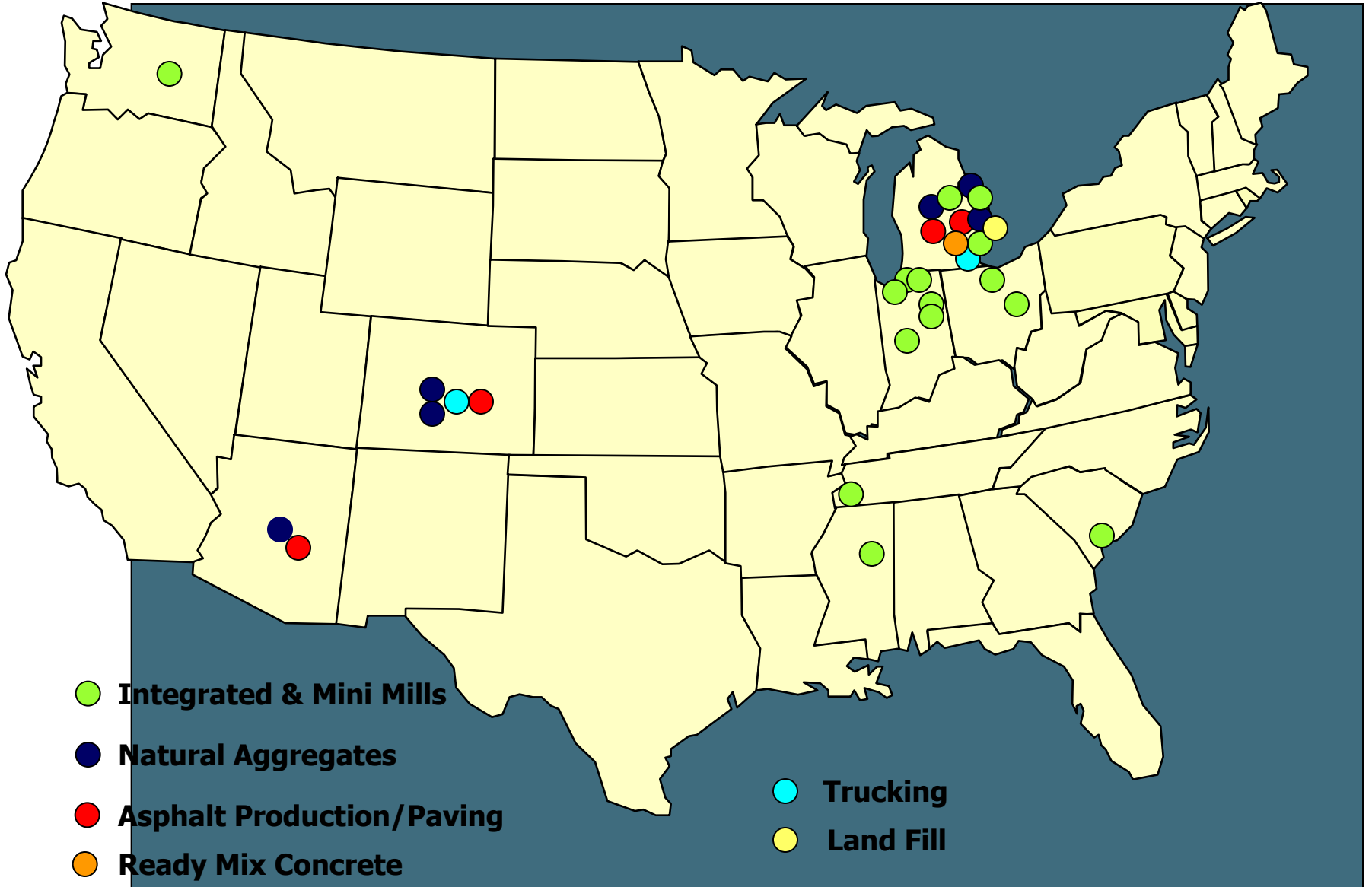
## Services & Products

- Steel Mill Services
- Aggregates
- Concrete
- Asphalt
- Trucking
- Scrap Handling
- Copper Picking
- Agricultural Products

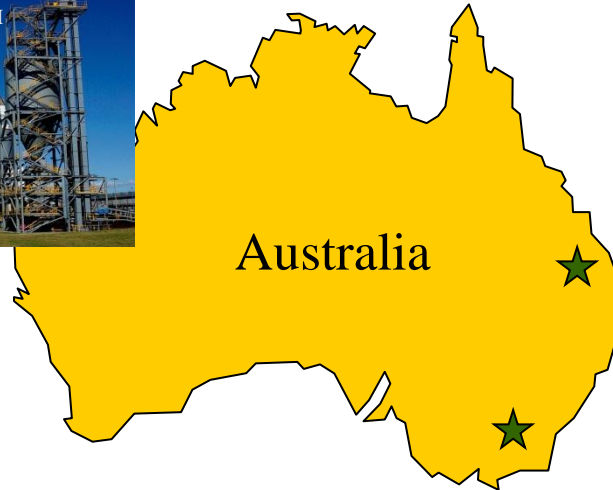
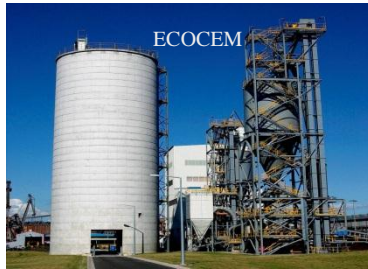
## Locations

- USA
- Australia
- Thailand
- France
- India
- Brazil

# Edw. C. Levy Group of Companies Domestic Operations



# Edw. C Levy Group of Companies International Operations



# What We Do



Steel  
Mill  
Services



# The Early Years Recycling Since 1918



## THE GROWING MARKET FOR SLAG Midwest Supplier is One of World's Largest

Less than 10 years ago, the commercial market for slag—a by-product of the steel industry—was practically nonexistent. Today, hundreds of thousands of tons of this low-cost “waste” are being profitably incorporated into construction projects throughout the country.

The Edward C. Levy Co. of Detroit, Michigan, is currently one of the world's largest suppliers and processors of this economical construction material. Levy processes the raw slag, an operation that consists

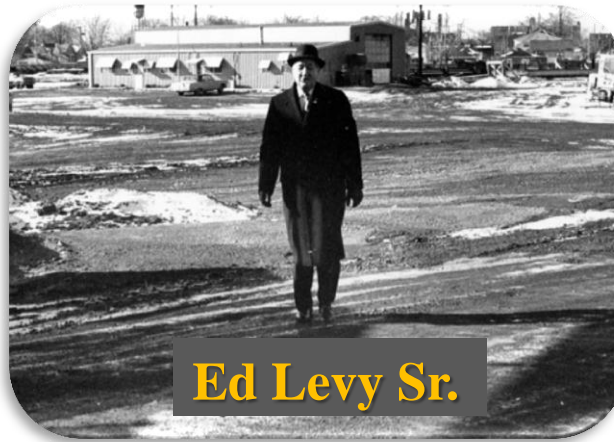
mostly of crushing and screening, then hauls it and spreads it.

On a recent parking lot job for the Ford Motor Company's new Lincoln Plant near Detroit, Levy's fleet of trucks, equipped with Gar Wood-St. Paul trailer bodies, spread more than 25,000 cubic yards of fine and coarse slag over the 500,000 square foot parking lot.

The huge parking area, later black-topped, will provide storage and loading space for the plant's production of Thunderbird and Lincoln automobiles.



Laying a base course of crushed slag for the half million square foot parking lot, a Levy truck dumps the first half of its 20-ton legal load with a Gar Wood-St. Paul front-mounted telescopic hoist.



**Ed Levy Sr.**

**DON'T BUILD A 1909 ROAD FOR 1959 CARS!**

**SPECIFY  
CRUSHED  
SLAG**

**BUILD ROADS, DRIVEWAYS AND PARKING LOTS THAT ARE NOT 50 YEARS BEHIND THE TIMES.**

- SLAG IS 100% CRUSHED—WON'T TURN SOUPY
- SLAG IS MORE THAN 99% FREE OF DELETERIOUS MATERIALS
- SLAG IS ROUGH AND ANGULAR—LOCKS AGGREGATE TOGETHER
- SLAG IS PRACTICALLY IMPERVIOUS TO FREEZING AND THAWING

*No shortage of this choicest of road building materials this year... SPECIFY CRUSHED SLAG*

PHONE  
VI 3-7200

**EDW. C. LEVY COMPANY**  
A Division of Lever Brothers Company  
 MAIN OFFICE, 8800 DIA AVENUE, DETROIT 7, MICHIGAN



# What We Do

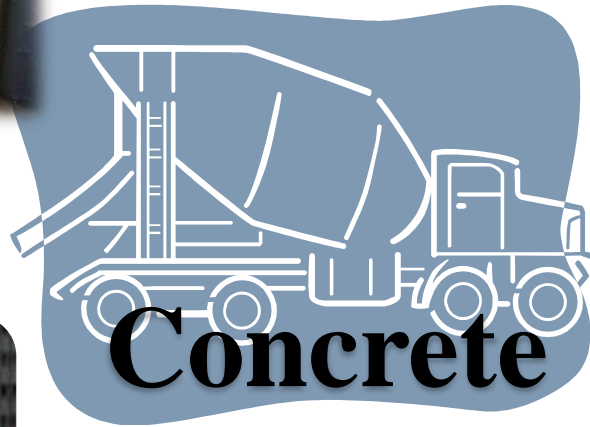


Aggregates





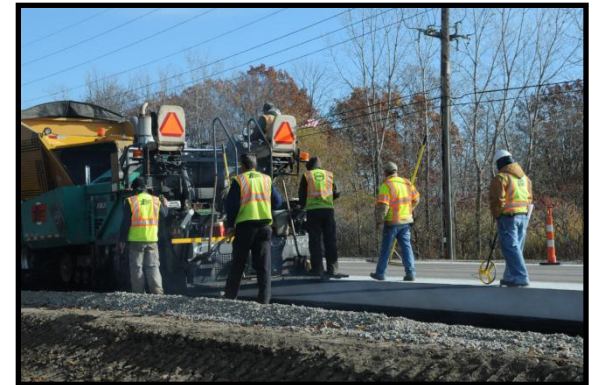
# What We Do



# What We Do



**Asphalt**  
**Since 1961**  
**RAP Since 1975**



# Asphalt Production & Paving



A decorative vertical bar on the left side of the slide, composed of various colored segments including blue, green, yellow, black, and light blue, arranged in a repeating pattern.

# **Reducing the Number of Asphalt Mixture Testing Disputes – The Michigan Solution**



## THE PROBLEM:

1. The number of disputed tests was continuing to increase every year and the MDOT Central Lab could not keep up with the workload.
2. Contractors and MDOT were constantly fighting about whose test results were correct.
3. Two large claims of over seven figures were paid out by MDOT over disputed test results in one year.



## THE SOLUTION:

1. A Lab Qualification Program modeled after AASHTO R-18 (“Establishing and Implementing a Quality Management System for Construction Materials Testing Laboratories”).
2. A Round Robin Testing Program to identify testing differences.
3. A rigid acceptance protocol that must be passed in order to do testing on any MDOT project.



# THE LAB QUALIFICATION PROGRAM

(Started in 2008)

- 5 Person Implementation Team – 3 MDOT and 2 Paving Association Contractor Members
- Requires a Quality Systems Manual Including Calibration and Maintenance Records
- Qualified Lab and Technician Database
- Requires Lab Inspections and Auditing
- AMRL Participation Required
- Review of Testing Procedures for Standardization and Identifying Variables
- Equipment Type Review



# THE ROUND ROBIN TESTING PROGRAM

- Same time every year
- 80-100 Labs participate yearly
- Test for 8 Mixture Properties (Gmm, Gmb, AV, VMA, VFA, F/A, Extracted AC, Ignition AC) Gradation on All Sieves, 1 and 2 Crushed Faces, and New This Year - Aggregate Specific Gravity, Fine, Coarse, and Combined
- Must submit an “Internal Audit Checklist” with the test results
- Deadlines must be met





# THE ACCEPTANCE CRITERIA

- A Tolerance Limit of 2 Standard Deviations from the Mean Value are used to analyze all parameters except gradation where 3 Standard Deviations are used. Labs whose results fall outside these tolerance limits are classified as “deficient”.
- Labs classified as “deficient” must respond in writing with an explanation of the root cause of the deficiency, the steps taken to prevent similar situations, and provide verification testing to verify that the problem is corrected.



## THE ACCEPTANCE CRITERIA (cont.)

- All written explanations of deficiencies are reviewed by The Laboratory Qualification Implementation Team.
- Satisfactory explanations result in “Successful Completion” of the Round Robin Program.
- Unsatisfactory explanations result in the deficient lab having to go to the next round of testing and run another sample for all properties.



# WHAT DID WE LEARN IN THE LAST 6 YEARS?

- At first, almost everyone was mad. There were many complaints including to my boss
- Some people said we “cherry picked” the samples
- To prevent talk between labs, we went to multiple samples later on
- Needed to use a standard reporting spreadsheet to make data analysis easier
- Some labs always fail



## WHAT DID WE LEARN IN THE LAST 6 YEARS? (cont.)

- At first, almost everyone wanted to leave their lab name out. Now over 80% use their lab name on the final results sheet
- Had to help the labs with their written responses at first. Developed a “Corrective Action Report” and a “Failures and Responses” guidance document
- Total oven time is critical
- Who does the calibrating of the sensitive equipment?



# WHAT DID WE LEARN IN THE LAST 6 YEARS? (cont.)

- The test methods are not always clear (i.e. 3-5 minute soak, damp towel, pat it dry, shake the puck to remove bubbles, lay the puck flat or on its side, reheating times, does the Gmm sample go back in the oven, how you load the gyro mold, etc.)
- We clarified unclear items in the testing methods – we let MDOT pick
- Standard Deviations keep getting smaller. Thus nearly the same rate of failures each year



# WHAT DID WE LEARN IN THE LAST 6 YEARS? (cont.)

- QC labs that are deficient can use a consultant lab or another of their company labs that have passed to do testing on MDOT projects
- QA labs that are deficient often have no alternates so they must move quickly to resolve any deficiencies
- Labs with good calibration and maintenance procedures and records seem to almost always do well – a good attitude helps

EQUIPMENT	DATE Calibrated	NEXT Calibration Date	By
Anton-PAAR 101	Jan 2013	Jan 2014	Anton-PAAR
Anton-PAAR 102	Jan 2013	Jan 2014	Anton-PAAR
Cannon BBR 11	MAR 2013	MAR 2014	Cannon
Cannon BBR 12	MAR 2013	MAR 2014	Cannon
PV 350	MAR 2013	11	PMC
Flow Meter FMA330B	MAR 2013	11	PMC
Wika Pressure Gauge	MAR 2013	11	PMC
Starrett Calipers	MAR 2013	11	PMC



# THE RESULT:

- Number of disputed tests:

**2008      439      No Round Robin**

**2009      267**

**2010      245**

**2011      112**

**2012      185**

**2013      128**

- Average round 1 failure rate:

QC Labs    31%

QA Labs    18%

- Also, we get along a lot better



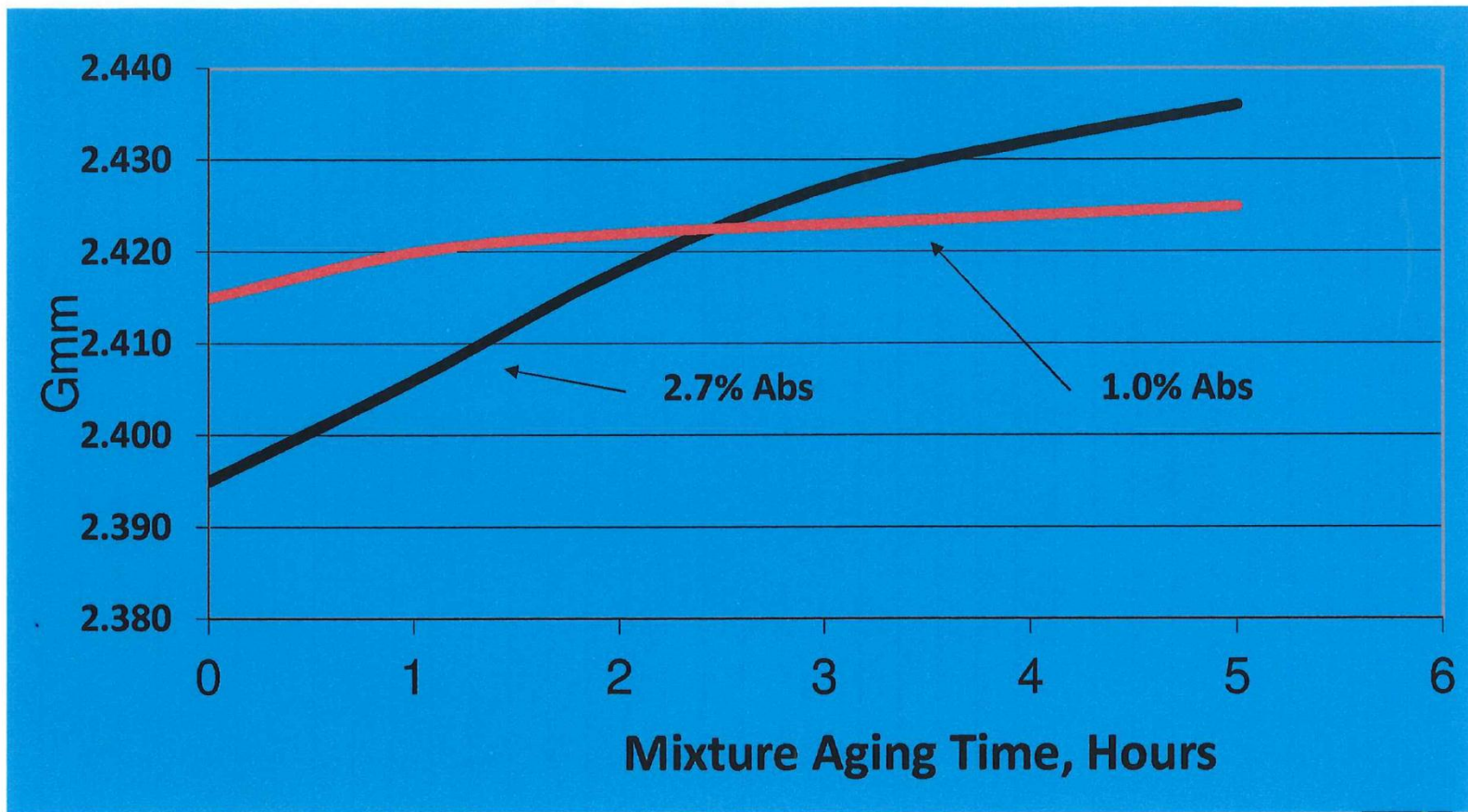


# THE RESULT (cont.):

Main reasons for failures:

- Attitude
- Improperly maintained equipment
- Variations in test methods
- Improperly calibrated equipment
- Variable oven time or temperature
- Improper splitting of samples
- Overloaded sieves

# Absorption Impact on Volumetrics





## ADVICE:

- Watch reheat times
- Fix the variables in the testing methods
- Use professionals to calibrate equipment
- Change the specs if there is something you don't like
- Watch temperatures
- Split samples properly
- Watch overloaded sieves
- Work together to resolve differences



**Thank You !**

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