

## Welcome to Waterproofing the Building Envelope

Vince Caserta CSI, CDT : Sales Director East vince@avmindustries.com | (646) 946-9717



## **AIA/CES Statement**

This program is registered with the AIA/CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product. Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.



# Agenda

- Introduction
- Waterproofing Vernacular

#### What makes Systems Different

- Products Selection Consideration
- Project Conditions Substrates
- Price Installed Cost

#### Key Aspects on Waterproofing Products

- Waterproofing Systems
- Methane/VOC Systems
- Details
- Waterproofing & Ancillary Systems

#### Quality Assurance and Risk Management

Questions

## Manufacturing Waterproofing since 1987

#### Tens of Millions of square meters of Aussie Skin installed worldwide

#### Key Projects include:

- AMLI, Marina Del Rey, Los Angeles CA
- AC Marriott Hotel Austin, TX
- Caesar's Palace, Las Vegas NV
- 22 Chapel Street/NYCTA Brooklyn, NY
- AMLI Chiquita, Miami, FL
- Ottawa LRT Expansion Projects
- RXR Realty, New York
- Orchard Project, Chicago IL
- Toronto Subway Extension Projects Crosslinx Expansion
- LAX Quantas Hanger, Los Angeles CA



## **Complete Below and Above Grade Solutions**

#### **Below Grade Waterproofing**

- Aussie Skin Pre-Applied HDPE Waterproofing
- Aussie Skin 560 LARR Approved Methane, Brown Field, VOC and Waterproofing membrane
- Aussie 580 AL LARR Approved Methane System, Brown Field and VOC, post-applied waterproofing
- Aussie 500/502- Roller/Spray Modified Polymer Bitumen Products
- Aussie 520 Single component Polyurethane (95% Solids)
- Aussie Mate 580 Aluminum Back Peel and Stick
- Aussie Swell Red 75% Bentonite Water Stop
- Aussie Tube Injectable water stop

#### **Deck Waterproofing**

- Aussie 500/502- Roller/Spray Modified Polymer Bitumen Products
- Aussie 520 Single component Polyurethane (95% Solids)
- Aussie Mate 580/582/585- Aluminum Back Peel and Stick
- Aussie 570 Hot Rubberized Asphalt
- Acrylic Deck Coating
- Urethane Deck Coating

# **Learning Objectives**

- Design and select the appropriate waterproofing system based on certain site conditions and construction methods.
- The importance of quality control measures for desired performance of waterproofing system



### What is Waterproofing? (ASTM D 1079)

• <u>Waterproofing</u>: Treatment of a surface or structure to prevent the passage of water *under hydrostatic pressure*.

#### **Contrast with:**

• <u>Dampproofing</u>: Treatment of a surface or structure to prevent the passage of water *in the absence of hydrostatic pressure*.

## Why waterproof at all?



# It's cheaper to do it right the first time!





# **Take a Rational Design Approach**

- Know the cost (\$) of water intrusion- <u>USE WATERPROOFING!</u>
- Let construction methodology and site conditions dictate the appropriate products.
  - Utilize your preferred waterproofing manufacturer(s)
- Specify appropriate quality assurance measures

# **Positive Side and Negative Side Waterproofing**

## Positive

- New Construction
- Maximum Protection
- Problem Prevention

## Negative

- Typically an existing building
- Remedial
- Problem Solving



## Waterproofing Applications



- Pre-Applied (a.k.a. blindside or property line waterproofing)
  - Waterproofing before concrete/shotcrete is placed.
  - Substrates include: Sheet Piling, Wood lagging, Shotcrete, Contiguous Piles, etc.

## Post-Applied

- Waterproofing placed directly onto substrate being waterproofed
- Substrates include: Concrete, CMU, Wood, Cement Board

## **Pre-Applied Substrates (Walls)**



Wood Lagging



Contiguous piles



Shotcrete



#### Sheet metal piles

# **Pre-Applied Substrates (Underslab)**





#### **Compacted Soil or Crushed Stone**

# **Pre-Applied Substrates (Underslab)**



**Mud Slab** 

# **Post-Applied Substrates (backfilled wall)**





CMU

#### Concrete

## **Post-Applied Substrates (Deck)**



- Wood
- Cement Board
- Fiberglass Roof Board



#### Concrete

# **Types of Waterproofing Products**

## Active Waterproofing





## Instantaneous Waterproofing



# NON-BONDED VS. FULLY ADHERED

## **Non-Bonded System**



## **Fully Adhered Systems**



### Mechanical vs. Adhered?

# **Pre-Applied Waterproofing Systems**

#### Bentonite (Active)

- Typically, Inexpensive
- Stapled seams
- Reliant on Confinement and Compaction
- Sensitive to construction traffic
- Should not be exposed to pre-hydration

#### Heat Welded Systems

- Expensive
- Reliant on skilled applicators
- Generally offered as a hybrid with a bentonite layer
- Often requires a protection slab or protection layer in pre-applied application

#### Fully Adhered Systems (Instantaneous)

- Can be confusing (Adhesive Bond versus Mechanical)
- Install Quickly Adhered seams
- Not reliant on confinement- can be used over void forms
- Not sensitive to Rain
- Will stop lateral Water-Migration (Adhesive Bond) (ASTM D5385)

# **Bentonite (Pre-Applied)**



#### Exposed Bentonite Glued to HDPE



# **Heat Welded Systems**





# HDPE (Adhesive Bond)





# **Challenges of Pre-Applied Waterproofing**

# **Product Durability**



# **Product Durability - Construction Traffic**



# **Product Durability- Weather**





# **Details**







# Tiebacks



# **Substrate Conditions**







### **Shotcrete Applications versus Cast In Place**

## Methane/VOC only vs Waterproofing and VOC/Methane





# Methane/VOC Only Solutions

# Thin Mil Solutions

- Standard Vapor Barriers
  - Commonly 10 and 15 mils thick
- EVOH Plastics
  - Commonly 20 mils thick
- Thin Aluminum/plastic coated membranes
  - 23 mils thick

# Hybrid Solutions

- Spray Applied Bitumen sandwiched between plastic and geotextiles
  - Typically 80 mils total thickness
- Factory controlled Bitumen and Aluminum Hybrids
  - Available as 60 mils or 80 mils thick

# Methane/VOC and Waterproofing Solutions

# Heat Welded Solutions

- PVC with Bentonite and Heat Welded Seams 60 mils thick
- HDPE with Bentonite and Heat Welded Seams 60 mils thick

# Hybrid Solutions

- Spray Applied Bitumen with Bentonite toppings
  - Typically 100 mils total thickness

# Fully Bonded Systems

- Minimum 80 mils thick HDPE
- Utilize coatings that dissolve when exposed to Concrete and Fully bond to concrete

# **Post-Applied Waterproofing Systems**

#### Bentonite (Active)

- Typically Inexpensive
- Mechanically fastened into substrate
- Reliant on Confinement and Compaction
- Should not be exposed to pre-hydration

#### Heat Welded Systems

- Expensive
- Reliant on skilled applicators
- Generally offered as a hybrid with a bentonite layer

#### Fully Adhered Systems (Instantaneous)

- Adhesive Bond
- Install Quickly Adhered seams
- Not reliant on confinement
- Will stop lateral Water-Migration (Adhesive Bond)



## **Bentonite (Post Applied)**



**Cardboard Panels** 



#### Geotextile



Exposed Bentonite Glued to HDPE



# Heat Welded Systems (PVC)









# **Fully Bonded (Roller Applied)**





Polymer Modified Bitumen | Cold Applied Polyurethane

# **Fully Bonded (Sheet Applied)**





# **Additional Waterproofing Considerations**

Terminations

Drainage

Concrete Joint Waterstops

Transitions from Below Grade

# **Grade Terminations**





- Protection
- UV Exposure

## Drainage



#### Performance Criteria

- Flow Value
- Crush Strength
- Cold Weather Flexibility
- Chemical Resistance
- Drainage Management System



 Not recommended for hydrostatic conditions

# WaterStop









## **Transition Surfaces**

- Compatibility
- Responsibility

# **Deck Waterproofing**

#### **Buried Systems:**

- Hot Rubberized Asphalt
- Cold Applied
  - Polyurethane
  - Polymer Modified Asphalt
- Sheet Systems
  - PVC, TPO
  - Peel & Sick
  - Modified Bitumen
  - Bentonite

#### **Exposed Systems:**

- Polyurethane
- Cementitious
- Acrylic
- **PMMA** (Polymethyl methacrylate)





# Where do you start?



# **Quality Control Measures**

- **1**. Engaged Manufacturer
- **2.** Approved Applicator
- **3.** Pre-construction Meeting
- 4. Independent third party inspector
- **5.** Strong warranty coverage (Labor and material)

# <u>The 99/1 principal</u>: 99% of leak problems occur from 1% of the waterproofed surfaces. *THE DETAILS*!



# Where we all want to get



## What we want to see....



# What we usually see.





# **Substrate Preparation**





# Damage





# "Not My Job"

## "Not My Problem"

# **Warranty Types**

### Standard Warranty

Typically need to prove the material failed before receiving replacement product

### Limited Labor and Material

Capped at the purchased price of the product

### No Dollar Limited Material and Labor

# **Owners 3rd Party (Trained) Independent Inspector**

#### Observe

- Substrate
- Installation
- Final Inspection prior covering

#### Record

Maintain Site Records

#### Report

- Send out site reports within 48 hrs. of site visit
- Immediate notification on discrepancies





### Waterproofing the Building Envelope

Vince Caserta CSI, CDT : Sales Director East vince@avmindustries.com | (646) 946-9717





## This Concludes the AIA Continuing Education Program

