Clemco Industries Corp.
presents

Design Considerations for Abrasive Blast Rooms & Recovery Systems

by Bob Kerr
Business Development Manager
**Design Considerations for Abrasive Blast Rooms & Recovery Systems**

**Performing Organization Name(s) and Address(es)**
Clemco Industries Corp, 445 Bush Street, San Francisco, CA, 94108-3730

**Abstract**

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PLANNING CONSIDERATIONS

- ENCLOSURE

- LOCATION OF ROOM
  - COMPLETELY INSIDE
  - ROOM INSIDE, COLLECTOR OUTSIDE
  - COMPLETELY OUTSIDE
  - PARTIALLY OUTSIDE

- RECOVERY SYSTEM LOCATION
  - ON TOP OF EXISTING FLOOR
  - FLUSH-MOUNTED (RECOVERY SYSTEM IN PIT)
TYPES OF ENCLOSURES

• FLANGE BOLT
  – ECONOMICAL
  – MAXIMUM WIDTH LIMITED TO 16 FEET

• HYBRID FLANGE BOLT
  – FLANGE BOLT WITH STIFFENERS

• COLUMN BOLT
  – ALLOWS FOR WIDER ENCLOSURES
  – STRONG ENOUGH TO SUPPORT MONORAIL
Flange Bolt Room
Column Bolt Room

- Structural steel framework
- Galvanized steel panels
• **GALVANIZED CONSTRUCTION**

• **FLOOR-TO-CEILING DOORS CAN BE INSTALLED INTO ONE OR BOTH ENDS**

• **PERSONNEL DOORS CAN BE INSTALLED IN ANY WALL PANEL**
  – REQUIRED EVERY 30 FEET PER O.S.H.A.

• **OPTIONS**
  – EXTERIOR WORK STATIONS
  – SPECIAL LIGHTING
Inlet Door Installation
AIR INLETS

- Baffled inside & outside
- Filtered
MANDOOR

- Panic Hardware
- Viewer with cover
ILLUMINATION

• TYPICALLY, 50-80 FOOT CANDLES IS SUFFICIENT

• FLUSH-MOUNTED TO CEILING
  – PROTECTED FROM INADVERTENT BLASTING
  – SEALED TO AVOID DUST INGRESS

• ADDITIONAL WALL-MOUNTED LIGHTS PROVIDE SHADOW FREE ILLUMINATION
Light Module
EXTERIOR WORK STATION
RECOVERY FLOOR TYPES

• SWEEP-IN
  – 2x2 AND 3x3 HOPPERS
    • MECHANICAL RECOVERY
    • FOR DENSE MEDIA, SUCH AS STEEL GRIT AND SHOT
  – M-SECTION STRIP
    • PNEUMATIC RECOVERY
    • FOR LIGHTWEIGHT MEDIA, SUCH AS GLASS BEADS, ALUMINUM OXIDE, AND PLASTIC

• PARTIAL FLOOR
  – MULTIPLE M-SECTIONS
  – SCREW
  – BELT
• FULL FLOOR
  – MECHANICAL RECOVERY
    • FLAT-TRAK
    • SCREW CONVEYORS
    • BELT CONVEYORS
  – PNEUMATIC RECOVERY
    • M-SECTION
FULL FLOOR RECOVERY

• COMPLETELY AUTOMATES THE MEDIA RECOVERY PROCESS

• MECHANICAL RECOVERY
  – SCREW CONVEYOR
  – BELT CONVEYOR
  – FLAT-TRAK

• PNEUMATIC RECOVERY
  – M-SECTION
PARTIAL FLOOR RECOVERY

• REDUCES MANHOURS SPENT ON RECOVERY, COMPARED TO SWEEP-IN
• SCREW OR BELT CONVEYOR(S) TO BE USED WITH DENSE MEDIA SUCH AS STEEL
• M-SECTION STRIPS TO BE USED WITH LIGHTWEIGHT MEDIA SUCH AS ALOX AND GLASS BEADS
HOPPER RECOVERY SYSTEMS

- SURFACE MOUNTED OR RECESSED
- LOW INITIAL COST
- REQUIRES MANUAL LABOR
  - SWEEPING OR SHOVELING
- 120 MESH MEDIA OR COARSER
3 x 3 HOPPER RECOVERY SYSTEM
3 x 3 HOPPER SWEEP-IN
BELT RECOVERY
SCREW RECOVERY
FLAT-TRAK

• LOW PROFILE
  – 6-1/2” TALL
  – MINIMAL EXCAVATION REQUIRED FOR PIT
  – SHORT RAMPS ON SURFACE MOUNTS

• FAST INSTALLATION
  – FAST DELIVERY - COMPONENTS SHIPPED FROM STOCK
  – MODULAR FLOOR
  – TRACKS WELDED TO STEEL FLOOR
  – FRAMES DROP IN PLACE BETWEEN TRACKS

• EASY MAINTENANCE
Flat Trak Drive

- Booted for protection
FLAT-TRAK
FLAT-TRAK
Bucket Elevator
Underspeed Monitor

- Used on all bucket elevators
- Prevents belt breakage
MEDIA CLEANING MECHANICAL SYSTEMS

• ABRASIVE CLEANER
  – BEST FOR HEAVIER MEDIA, I.E. STEEL GRIT
  – ROTARY SCALPING DRUM
    • REMOVES OVERSIZED PARTICLES / DEBRIS
  – HIGH VOLUME STREAM OF AIR
    • REMOVES DUST --- TO DUST COLLECTOR
  – INCLUDES 10 CUBIC FOOT STORAGE HOPPER
  – CAN PROCESS UP TO 15 TONS PER HOUR
  – CAN FEED 1, 2, 3, OR 4 BLAST MACHINES
    • MULTIPLE POT STAND REQUIRED FOR MORE THAN ONE BLAST MACHINE
ABRASIVE CLEANER

- Scalping drum
- Air flow control valve
- Dust
- Debris
- Fines
- Reusable media
- Abrasive Cleaner
- Dust and debris laden media from Bucket Elevator
- Baffles
- Vacuum inlet
- Blast machine (or storage hopper)
M-Section

• Pneumatically operated channels
• No vibration or screw conveyors
• Handles all light-weight media
SWEEP-IN M-SECTION WITH DRY FILTER
M-SECTION
M-section Floor

- Full recovery system
Crossdraft Transition
RECLAIMER
PNEUMATIC SYSTEMS

- CYCLONE SEPARATOR FOR USE WITH LIGHTWEIGHT MEDIA
- MEDIA, DUST, AND DEBRIS ENTER RECLAIMER WHERE THEY SPIN
- DUST, FINES, AND BROKEN MEDIA ARE DRAWN OUT WITH EXHAUST AIR TO DUST COLLECTOR
- ONLY CLEAN, REUSABLE MEDIA ENTERS BLAST MACHINE
- RUBBER-LINED TOP SECTIONS ARE NEEDED WITH AGGRESSIVE MEDIA
Blast & Reclaim System

- Reclaim
- Storage Hopper
- Blast Machine
M-SECTION FULL-FLOOR
(note wall sheeting for improved illumination)
PRE-ASSEMBLED BLAST ROOMS

• AVAILABLE FOR ALL TYPES OF RECYCLABLE MEDIA
  – FLAT-TRAK RECOVERY SYSTEM WITH ABRASIVE CLEANER FOR USE WITH HEAVY MEDIA, I.E. STEEL GRIT
  – M-SECTION RECOVERY SYSTEM WITH RECLAIMER FOR USE WITH LIGHTWEIGHT MEDIA, I.E. GLASS BEADS OR ALOX
Preassembled Room
Preassembled Room
BLAST MACHINES

• AUTOMATICALLY REFILLED AFTER MEDIA HAS BEEN CLEANED

• MEDIA VALVE(S) MUST BE SUITABLE FOR THE ABRASIVE BEING USED

• BOTTOM CONE MUST ACCOMMODATE ANGLE OF REPOSE OF MEDIA BEING USED

• MUST BE EQUIPPED WITH REMOTE CONTROLS
VENTILATION

• PROVIDED BY DUST COLLECTOR FAN
• INLET VELOCITY: 500 FT/MIN MINIMUM
• CROSSDRAFT VENTILATION RATES
  – 50 FEET/MIN FOR STEEL OR GLASS BEADS
  – 80 FEET/MIN FOR ALUMINUM OXIDE
  – 100 FEET/MIN FOR SAND OR DUSTY MEDIA
VENTILATION

• REVERSE-PULSE CARTRIDGE
  – FILTERS 99.85%
  – EXHAUSTED AIR IS 0.00218 GRAINS/CUBIC FT
  – AIR TO CLOTH RATIO OF 2:1 OR LESS
  – COMPACT, MODULAR UNITS
Dust Collector

- 4000 - 300000 CFM
- Sloped roof
- Modular construction
Dust Collector
DUST COLLECTION
Dust Collector

- Magnehelic Gauge
- Pressure Gauge
VENTILATION

• TO DETERMINE THE SIZE OF THE DUST COLLECTOR, USE THIS FORMULA:

\[
A = W \times H \times V
\]

CFM of collector = A
Room Width = W
Room Height = H
Ventilation Rate = V

For a room 10’ x 10’ x 20’ with steel grit, we use:

\[
A = 10' \times 10' \times 50'/\text{min}
\]

\[
A = 5000 \text{ CFM}
\]
WORK-PIECE HANDLING

- FORKLIFTS
- RAIL-MOUNTED WORK CARS
- OVERHEAD MONORAILS
- EXTERIOR WORK STATIONS
- TURNTABLES
- HORIZONTAL ROTATION DEVICES
OVERHEAD MONORAIL
Workpiece Handling

- Powered horizontal rotation
DROP-DOWN TURNTABLE
ELECTRICAL CONTROL PANEL

• INCLUDES MOTOR STARTERS
• AUTOMATED START-UP PROGRAM
  – AVOIDS MEDIA JAMMING AND EQUIPMENT DAMAGE
• HOUR METER MONITORS USAGE
  – AIDS IN SCHEDULED MAINTENANCE TASKS
COMPRESSED AIR SUPPLY

• POWER FOR MANY COMPONENTS
  – AUTOMATED FLOORS
  – REVERSE PULSE COLLECTORS
  – BLASTING OPERATION
    • NOZZLE ORIFICE
    • NUMBER OF OPERATORS
  – SUPPLIED AIR RESPIRATORS

• CONSIDER OTHER DEMANDS ON SHOP AIR
OPERATOR SAFETY EQUIPMENT

- AIR-FED RESPIRATOR
  - APOLLO 60 OR APOLLO 20
- AIR FILTER
  - CPF-20 OR CPF-80
- CO MONITOR AND ALARM
  - CMS-1
- PROTECTIVE CLOTHING
  - BLAST SUITS
- HELMET COMMUNICATION SYSTEMS
  - HCS-1
APOLLO 60 RESPIRATOR
CPF-20
BREATHING AIR FILTER
CARBON MONOXIDE MONITOR ALARM
CLEMCO
BLAST
SUIT
HELMET COMMUNICATIONS
BLAST & PAINT ROOM
AIRCRAFT STRIP BOOTH BOOTH
MEDIUM SIZED & SMALL BOOTHS
Thank you
The demand for abrasive blasting is extensive. Ship building and maintenance in Singapore, construction in Saudi Arabia, refining in Houston… these are but a few of the major industries where abrasive blasting has kept pace with demand calling for Clemco specialization and innovation. Manufacturing and distribution throughout 6 continents… wherever there is industry, Clemco is there.