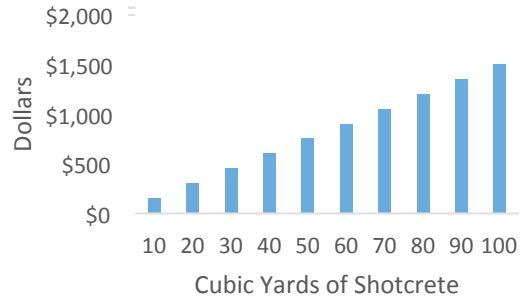
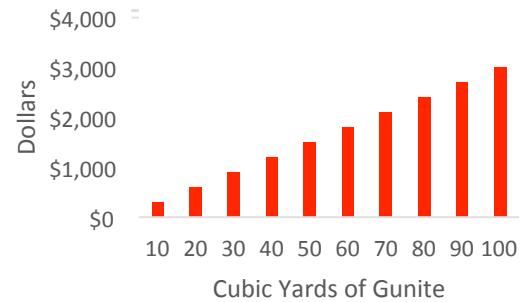




Feasibility Analysis for On-site Recycling Device During Shotcrete Application



Amount of money lost due to wet mix rebound (assuming Nationwide's 10% waste factor)



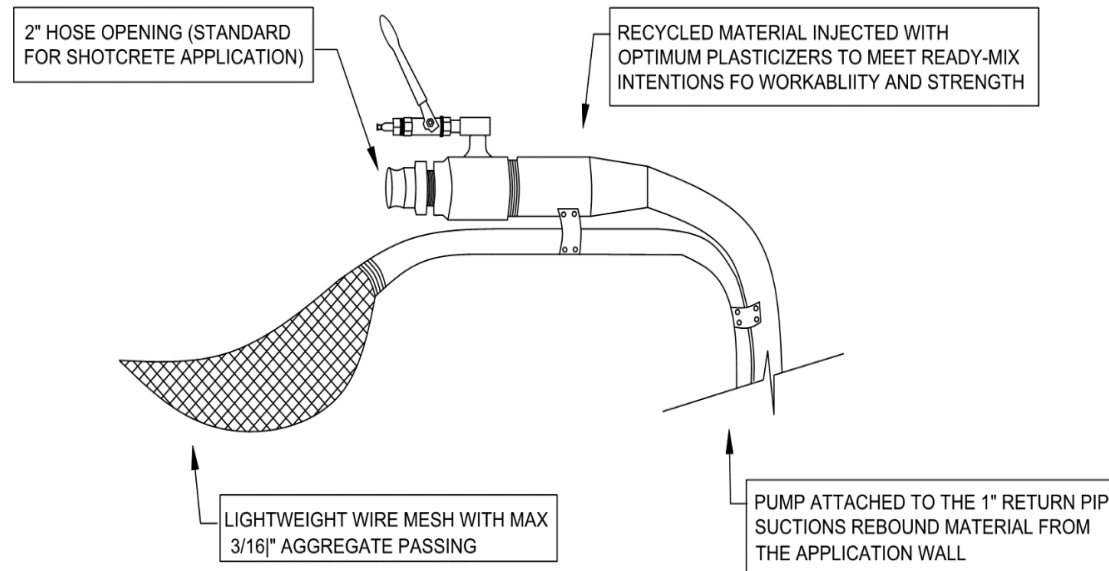
Amount of money lost due to dry-mix rebound (assuming industry-established 25% average)

Current Methods of Reduction:

- Shooting distance, angle, and pressure
- Fly ash
- Silica Fume
- Metakaolin
- Water-cement ratio

Shotcrete application has proven advantages over cast-in-place concrete in many different situations. Ease of access, minimal formwork, and higher productivity are all prime examples. Unfortunately, concrete waste is still one of the highest percentages of overall waste in the construction industry. Shotcrete rebound, the material that falls from the wall due to lack of cohesion during installation, has slowly reduced due to ready-mix alterations over the years, but effective recycling processes have yet to be implemented. Concrete recycling plants have helped re-route concrete waste from landfills, but they still increase time and money spent cleaning and transporting the material. In some cases, such as gunite solutions, the material cannot be recycled, and instantly becomes waste. Instituting reclaim devices underneath shotcrete nozzles will not only catch the rebounded material, but feed it through the main hose for re-application. Since this has never been done, initial feedback from industry professionals set the tone for marketing and feasibility of this potential product

Key Words: shotcrete, sustainability, rebound, waste, ready-mix, recycle, reclaim



Concrete Superintendents:

- Held mixed sentiments towards feasibility of nozzlemen mobility and accuracy
- Both believe, if design is perfected and easy enough to use, would be profitable
- Advantageous for large vertical walls with minimal areas of dense rebar



Shotcrete Nozzlemen:

- Were more resistant to the idea of changing traditional methods
- Increased weight of reclamation device would tire out workers
- Not efficient for any jobs under 100 yards
- Might only be adopted once industry standards change, not by choice
- Would need HUGE economic benefits



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