ArcelorMittal 3, Pneumatic Conveyor Design - Team A

Overview
ArcelorMittal, is a world-wide leader in steel production, has a pneumatic conveyer transporter that moves hazardous dust from a bag house to a truck. The pneumatic conveyer clogs and is at its end of life. The project is to create a new design to replace the current pneumatic conveyer.

Objectives
Our team’s objective is to create a detailed design of a replacement system for ArcelorMittal’s current pneumatic conveyer transporter. This new system should not be re-engineered from the original system.

Approach
• Describe the approach your team took to solve the problem using a bulleted list of steps
• We gathered the customer needs from a site visit with our sponsor
• We brainstormed concepts for the system and
• Patents of the original system and other similar devices were researched
• A prototype made of PVC pipe was used for testing our design
• Models of our prototypes were made in SolidWorks
• Prototype was tested with pressure gages and by the amount of dust moved
• Our final design was 3D printed at the Learning Factory
• PLC programming was used to control the system
• Graphs and plots were generated uses fluids equations and a range of parameters

Outcomes
• A new device called the Ejector will be used to replace the old system
• The Ejector will not clog like the old system and will be more efficient as well
• Maintenance time will be reduced to zero hours as a result of this project
• The ejector will use 1/3 of the amount of compressed air that the current system uses
• An updated control system will be used to control the Ejector
• ArcelorMittal will save $14,000 as a result of this project