

# IPRO 321

## Enhancing Reliability and Performance of a Paper Shredder

### The Problem

- The Royal shredder has a short life cycle
- The Royal shredder doesn't have the potential to shred other items that consumers would expect from a shredder.
- Too noisy.
- Safety with shredders is a major issue. Toddlers are susceptible to having their fingers cut off when sticking their fingers in the shredder.

### What do we do?

- Conducted several studies that analyzed the following:
  - oTorque- the motor's ability to drive the blades in order to shred
  - oRPM- the speed of the motor
  - oNoise
  - oGear Ratio
- Compared Royal shredder to a leading shredder.
- Determined what needed to be improved on the shredder.



**Sponsor:** Seth Lewis, President of the Manhattan Group

The Manhattan Group is working with the Royal company to improve the reliability and performance of one of its paper shredder models. Seth Lewis asked for our assistance with this issue and this is what the team was able to deduce.

### The Team



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### So what?

- The shredder's gear train is the source of many problems
  - oTeeth will break after many uses
  - oMain cause of noise
  - oReduces shredder's lifetime
- The motor doesn't produce enough torque, which prevents it from shredding several materials that consumers would expect from a shredder.
  - oCDs
  - oCredit cards

### And?

*And*, in order to improve the reliability of the Royal shredder, we recommend the following:

- Enlarge select gears in order to extend the life cycle of the shredder.
- Modifying the gear train will reduce the noise generated by the shredder at lower speeds.
- Use a motor that provides double the amount of torque so that it can have the ability to shred more paper and other items such as CDs and credit cards.
- Plug any openings between the shredder and the waste basket to reduce noise.