TRI-PHASE AUTOMATION

Engineering Excellence

SUCCESS STORY

Innovative Mattress Recycling Machine Prototype

THE COMPANY

A leading design and engineering firm specializing in custom automation systems, focusing on developing innovative solutions for complex industries. With expertise in mechanical and electrical integration, the company works on diverse projects, from industrial systems to cutting-edge prototype designs aimed at solving real-world problems.

OVERVIEW

The company embarked on a groundbreaking project to develop a mattress recycling machine aimed at solving the growing issue of mattress disposal. Due to the complexity of recycling the materials, particularly the metal coil springs, mattresses are banned from many landfills. This innovative machine prototype uses a two-axis gantry system to extract metal coil springs from mattresses, providing a sustainable solution for mattress recycling.

CHALLENGE

Mattress disposal is a significant environmental challenge, particularly due to the metal coil springs, which are banned from most landfills. Traditional recycling methods are ineffective, and a solution was needed that could efficiently extract the metal coils without damaging other mattress materials. Additionally, the system needed to be customizable to handle various mattress sizes and coil types, with high precision to ensure effective recycling.

SOLUTION

To address these challenges, a 1/8 scale prototype of an automated mattress recycling machine was designed. The machine utilizes cutting-edge technology to deconstruct mattresses with precision and efficiency, focusing on extracting the metal coil springs for reuse. It is powered by a series of DC motors, which drive mechanical screws that perform the extraction process. The system is controlled by a two-axis gantry, using actuators and servo motors to provide precise movements.

DC Motors and Gantry System:

The machine is powered by DC motors that drive mechanical screws to extract the metal coil springs. These motors are integrated into a two-axis gantry system, controlled by actuators and servo motors for precision.

User-Customized Input:

The machine allows users to input specific mattress parameters, such as dimensions and coil spring types, enabling the system to calculate where and how to extract the coils effectively.

Easy Wiring and Integration:

The wiring schematic provided was intuitive, enabling seamless installation and setup. The system was easily wired and operated correctly on the first attempt, demonstrating the system's efficiency.

RESULTS & OUTCOMES

The collaboration resulted in the successful development of a fully functional prototype that effectively addressed the mattress disposal challenge, providing an efficient solution for recycling metal coil springs. The integration of realtime program updates was pivotal in speeding up the testing and troubleshooting phases, enabling the team to make quick adjustments and refinements. This allowed for a more streamlined R&D process, ensuring that the system was both reliable and efficient. The prototype demonstrated its potential as a scalable, sustainable solution to mattress recycling, offering a practical alternative to traditional disposal methods and contributing to environmental sustainability.

REAL-TIME PROGRAM UPDATES

Remote program updates allowed for fast testing iterations, drastically reducing time spent on troubleshooting.

SUCCESSFUL PROTOTYPING

The prototype worked flawlessly during its first operation, showcasing the robustness of the design and wiring.

SUSTAINABILITY IMPACT

This innovative machine contributes to sustainability efforts by providing a viable solution to mattress recycling, reducing landfill waste.

AUTOMATED EFFICIENCY

The integration of motors, actuators, and controls allowed for automated recycling, proving the viability of such systems in real-world applications.

> I was very pleased with the programming and support received from Tri-Phase. The ability for them to remotely update the program allowed me to go through testing and troubleshooting iterations very quickly. Most of my time during these types of R&D projects are spent on testing so getting real-time program updates is a massive time saver.
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> *- Jesse Knoble, Knoble Designs LLC*

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