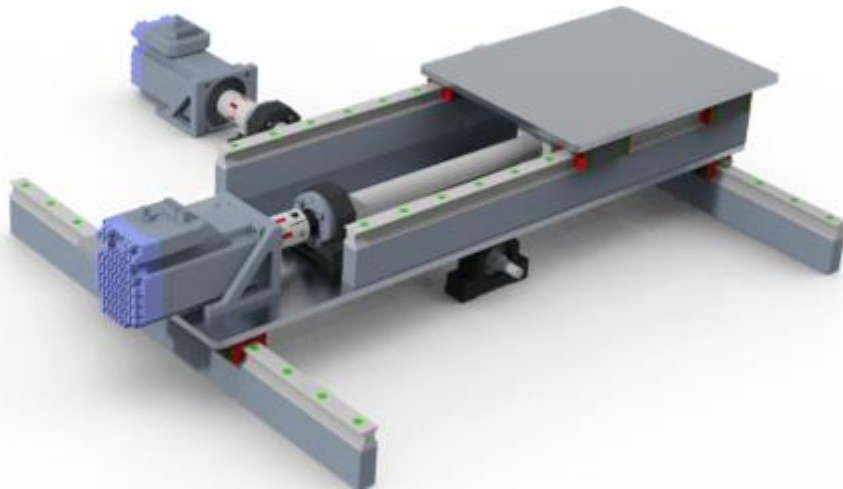


## Design of a cross-slide Carriage



During the second year of my mechanical engineering studies, our team of four was tasked with developing a conceptual design for a metal spinning machine. To structure our approach efficiently, we divided the project into four key components: the cross-slide, the machine frame, the tailstock, and the main spindle.

This document provides a concise summary of the design process for the cross-slide, whose primary function is to support and position the metal spinning tools.

The design process began with initial estimations of the forces expected during the metal spinning operation. These estimates guided the selection of appropriate linear guides and sleds to ensure smooth and precise tool movement. To convert the rotational motion of the motor into linear displacement, we selected a ball screw suited to the anticipated loads and operating conditions.

Once the fundamental calculations were completed, we researched commercially available components to minimize the need for in-house manufacturing in future iterations of the project. By consulting manufacturers' catalogs, we identified suitable off-the-shelf components and obtained existing CAD models for integration into our design.

To validate the concept, we developed an animated model that simulated the cross-slide's movements during operation. This step allowed us to assess potential limitations, identify possible collisions, and refine the design accordingly.

Through this process, we ensured that the cross-slide was both functional and feasible for implementation, laying a solid foundation for future development.