

# ABDULLATIF MAHMOUD

M.Sc. in Structural Engineering | İstanbul Kültür Uni.



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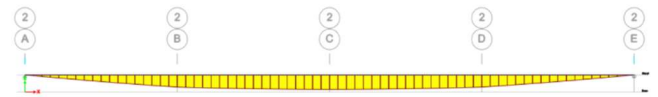
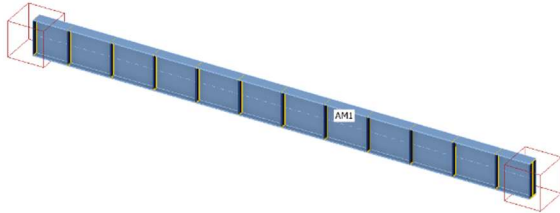


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## PLATE STEEL GIRDER WITH END PLATE AND INTERMEDIATE STIFFENERS - PERSONAL PROJECT



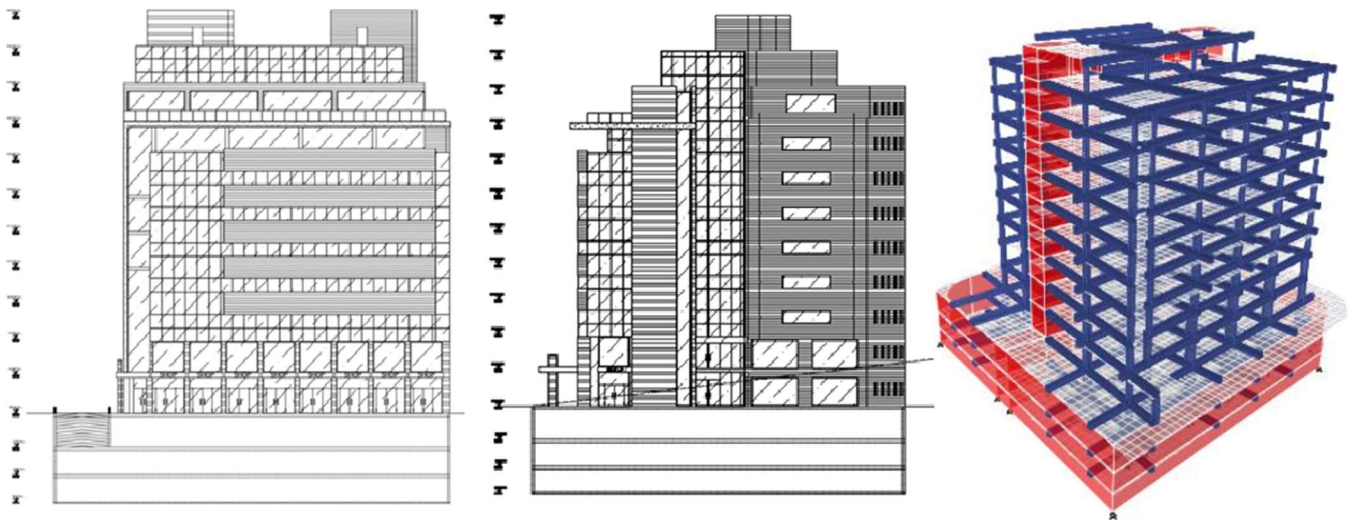
### What?

- Designed and prepared **calculation pack** for a steel plate girder according to **AISC**.
- Conducted **preliminary design** of flange, web, end plate, and intermediate stiffeners.
- Provided **mark-ups** and guidance for drafting team.

### How?

- Extracted loads and analysis results from **ETABS**.
- Used **Excel** for flange/web sizing, serviceability check, moment capacity adequacy, section classification, and web shear buckling checks.
- Designed and verified end plate shear buckling and bearing capacity.
- Designed intermediate stiffeners against shear buckling.
- Applied **IDEA StatiCa** for 3D visualization and **Bluebeam** for 2D drafting.

## MULTI-STORY COMMERCIAL BUILDING DESIGN – SENIOR PROJECT / BIRZEIT UNI.



### What?

- Developed a 3D structural model of a multi-story commercial building in **ETABS** and **Tekla**.
- Calculated design loads and designed reinforced concrete (RC) waffle slab, beams, columns, and walls.
- Ensured structural adequacy against lateral loads.
- Delivered full calculation pack and detailed engineering drawings.

### How?

- Considered dead loads, live loads, and material unit weights.
- Modeled structure in **ETABS** to obtain design moments, shear, and deflections of beams, columns, and frames.
- Performed pushover analysis in **ETABS** to evaluate seismic/lateral performance.
- Designed slabs in **SAFE** for moment, shear, and deflection checks.
- Conducted detailed element design using Excel spreadsheets
- Used **ETABS** for 3D visualization and **AutoCAD** for 2D drafting.

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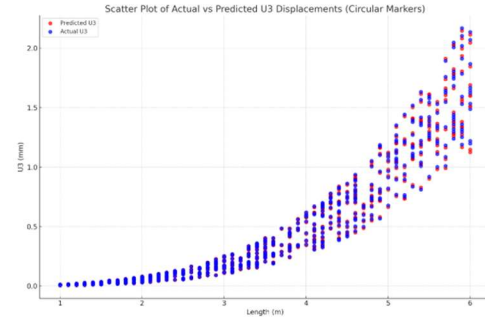
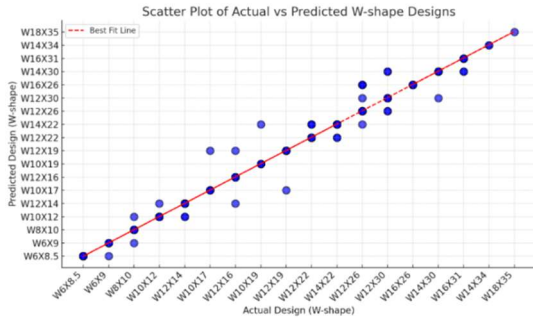


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## THESIS (DATA-DREVIN-BASED MECHANICAL ANALYSIS AND DESIGN) – İKÜ



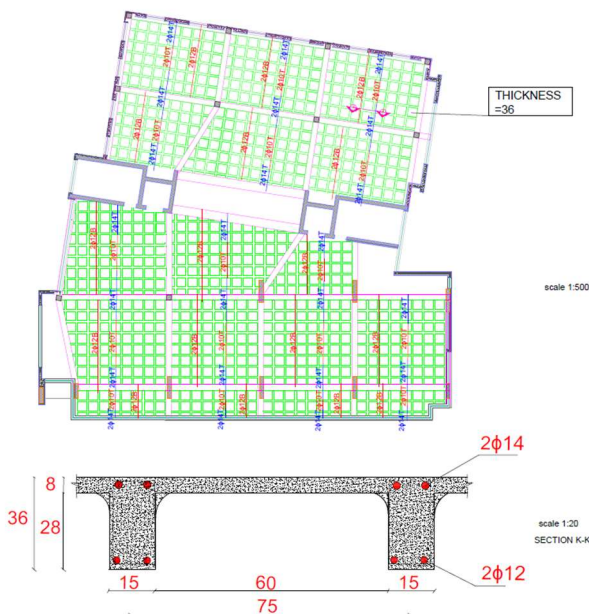
### What?

- Developed a machine learning-based framework to enhance structural analysis and design of steel cantilever beams.
- Focused on predicting optimal I-section profiles and vertical displacements.
- Automated analysis and data generation using ETABS API (dataset of 2,601 cases).
- Evaluated classification and regression models for accuracy and design reliability.

### How?

- Extracted structural response data (loads, lengths, material properties) from ETABS simulations.
- Built dataset and trained supervised ML models:
  - a) **Decision Tree Classifier** for I-section selection.
  - b) **Linear / Decision Tree / Random Forest Regressors** for displacement prediction.
- Assessed performance using **MSE and R<sup>2</sup>**; achieved  $R^2 \approx 1$  for regression and  $>0.94$  for classification.
- Visualized predictions vs. actual ETABS outputs using scatter plots and design charts.
- Implemented automated workflow in **Python + ETABS API** for integration into design process.

## REINFORCED CONCRETE WAFFLE SLAB DESIGN – BIRZEIT UNI.



### What?

- Designed reinforced concrete waffle slab system for a multi-story commercial building.
- Optimized slab thickness and reinforcement to meet strength and serviceability requirements.
- Produced detailed engineering drawings with reinforcement layout and section details.
- Prepared calculation pack for structural verification and approval.

### How?

- Determined design loads (dead load, live load, finishes) and applied material unit weights.
- Modeled waffle slab in **SAFE** to obtain design moments, shear forces, and deflections.
- Verified performance against strength and serviceability criteria (crack control, deflection limits).
- Designed reinforcement for slab ribs, top/bottom layers, and slab-column junctions.
- Prepared detailed 2D reinforcement drawings in **AutoCAD**, including slab layout and section cut.