This study investigates the integration of a Construction Consolidation Center (CCC) into urban construction logistics to enhance efficiency while reducing costs and social burdens. A CCC serves as a consolidation hub, facilitating material bundling and Just-In-Time (JIT) deliveries. We analyze multiple scenarios to assess its benefits for cities, construction companies, and suppliers.

Our problem considers multiple urban construction sites requiring materials from external suppliers. A CCC provides storage and operates a heterogeneous vehicle fleet. Suppliers can choose to deliver materials directly to construction sites or via the CCC.

We develop a mathematical model to optimize daily delivery plans, including vehicle assignment, scheduling, and routing for two delivery types: (1) supplier-to-site or CCC and (2) CCC-to-site. The objective is to minimize total costs, including transportation, inventory, and loading/unloading costs. A rolling horizon approach is implemented to dynamically adjust plans weekly, addressing uncertainties.

Experiments will evaluate the CCC's impact under various urban policies, such as vehicle restrictions and delivery time windows. Additionally, key parameters will be analyzed to determine under what conditions a CCC is beneficial for cities and private stakeholders.