Research Project for a Ph.D student supported by the CSC

Distribution Network Planning and Collaborative Transportation in City Logistics

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Topic Number: VII-2
Expected Duration: September 2014 - February 2018

In a big city like Shanghai and Paris, the daily demand for urban freight distribution is huge, especially in today’s e-commerce era. This huge demand together with the rapid increase of private cars leads to traffic congestion, air pollution, and excessive energy consumption. Optimizing the logistics network and reducing the number of vehicles circulating in a city are thus primordial for reducing air pollution and energy consumption, improving living conditions and assuring the sustainable development of a city. These goals can be achieved by creating urban distribution centres which facilitate the consolidation of freight pickups and deliveries in urban freight distribution and by collaborations among shippers or carriers.

In this project, we will study distribution network design/planning and collaborative transportation in city logistics. Two important problems or issues to be addressed are strategic location planning of urban logistics facilities and tactical planning of urban freight distribution operations. The first problem determines optimal locations for urban logistics facilities such as urban distribution centres (UDCs), and the second problem optimally assigns urban logistics resources such as UDCs and vehicles to urban freight distribution operations. The tactical urban distribution planning should consider collaboration opportunities among shippers and carriers. Here the collaboration among shippers or carriers means they share their transportation requests so that these requests can be consolidated in less pickups and deliveries compared with independent operation of each shipper or carrier.

As we know, urbanisation is a global trend, especially for developing countries like China. Each city has to plan its logistics system and urban freight distribution. This project aims at developing mathematical models and optimization algorithms for location planning of urban logistics facilities and tactical planning of urban freight distribution operations. The results of the project can be used by the municipal authority, urban planners and logistics practitioners of a city in its urban development planning, can help a city to reduce its traffic congestion, air pollution, energy consumption, and can thus contribute to the sustainable development of a city.

References


