

Benefit analysis – ConvL

Increasing delivery capacity by using
large trunks

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Introduction

- Benefit analysis is based on an assumption that there is a need to increase the capacity of parcel delivery
- Capacity can be increased with conventional packet automations such that vans are replaced with trucks, which have large-sized trunks (option *ConvL*), and the delivery cycles last 50% longer than in option *Conv*
- Option *ConvL* reduces a need to drive between the sortation hub and a delivery area because a truck can transport 100% more parcels to the delivery area compared to a van
- Delivery time window in option *ConvL* is one week

Present automatons

- Parcel delivery arrangement comprises the following:
 - Each of delivery areas (1, 2) comprises nine conventional packet automatons
 - A van transports *daily* parcels between a sortation hub and a delivery area

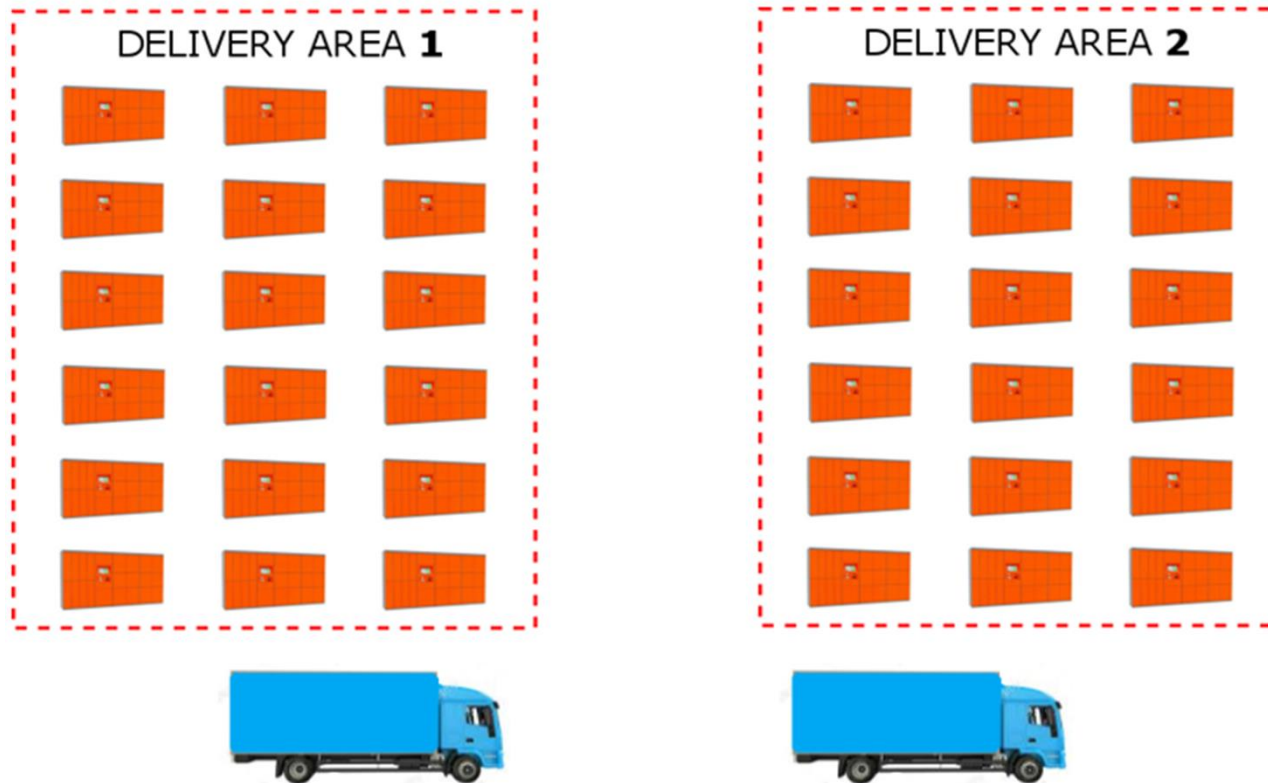


Options

- Benefit analysis concerns two options for increasing the parcel delivery 100% on delivery areas 1 and 2
- Option *DT50* concerns use of Delivery trailers and it is described in Benefit analysis - DT50.pdf
- Option *ConvL* means that the number of conventional packet automatons is doubled (from 9 to 18 per delivery area) and two vans are replaced with two trucks
- In the both options a delivery cycle starts from a sortation hub and ends to the sortation hub

Option *ConvL*

- All automatons are conventional packet automatons:



Comparison

- Benefit analysis is based on the cost comparisons between option *ConvL* and option *DT50*
- Some of the following assumptions concern loading of parcels and some concern transportation of the parcels
- The rest of the assumptions concern employee costs and investment costs
- Benefit analysis can be made with different assumptions or with real data, if available

Loading and transportation

- **Assumption 1:** the trunk of a truck is manually loaded by conveying parcels in trolleys into it
- **Assumption 2:** the loading actions last as long in option *ConvT* than in option *DT50*
- In option *ConvL* a delivery cycle comprises at most *eighteen* delivery sites, i.e. the all delivery sites on a delivery area
- **Assumption 3:** In option *ConvL* a delivery cycle lasts 50 % longer than in option *Conv*
- Assumption 3 means that a trip from the sortation hub to a delivery area and back lasts 50% of a work day
- This trip time is saved by using a truck instead of a van

Employee costs

- Employee is here a truck driver
- **Assumption 4:** in option *ConvL* a work day is seven hours and the employee cost is 36000€ per year
- In option *ConvL* the total employee cost for delivery areas 1 and 2 is 108000€, because two drivers are needed and their work day is 3.5 hours longer than a regular work day
 $(2 \times (3,5 + 7)/7 \times 36000\text{€} = 108000\text{€})$
- Note: in option *DT50* the total employee cost for delivery areas 1 and 2 is 82286€, because the work day of two drivers is one hour longer than the regular work day

Investment costs

- **Assumption 5:** price different between a secondhand truck and a secondhand van is 10000€, i.e. this sum must be paid when replacing a van with a truck
- In option *ConvL* the investment includes nine new conventional packet automatons per delivery area, and two vans are replaced with two trucks, therefore the investment costs are:
$$2 \times 9 \times 10000\text{€} + 2 \times 10000\text{€} = 200000\text{€}$$
- Note: In option *DT50* the investment includes altogether eight Delivery trailers and the investment costs are 160000€

Benefits

- Investment costs in option *DT50* are 20% smaller than in option *ConvL* ($1/100 \times (200000 - 160000) / 200000 = 20\%$)
- Operating costs include in this benefit analysis only employee costs
- As calculated in the above, the total employee cost in option *ConvL* is 108000€ and the total employee cost in option *DT50* is 82286€, thus the difference is about 25700€
- Operating costs in option *DT50* are 24% smaller than in option *ConvL* ($1/100 \times (108000 - 82286) / 108000 = 23.8\%$)
- The operating costs savings are 25700€ per year