CIVITAS
Sustainable and smart mobility for all
2030

CIVITAS indicators

Congestion – Version 5 (TRA_FC_CG5)

DOMAIN

Transport	Environment	Energy	Society	Economy

TOPIC	**Urban freight transport**	
IMPACT	**Motorised freight transport** *Reducing freight traffic in the urban area*	**TRA_FR**

Category

Key indicator	Supplementary indicator	State indicator

CONTEXT AND RELEVANCE

Motorised freight transport refers to the movement of goods using motor vehicles such as trucks and vans. This mode of transport is essential for delivering goods to consumers in urban areas. However, freight vehicles are significantly larger than passenger cars and contribute disproportionately to energy consumption, emissions, noise, and space occupancy. These factors negatively impact the quality of life and environmental sustainability in cities. Reducing freight traffic in urban areas allows for healthier and more liveable urban environments.

This indicator provides a measure of the contribution of motorised freight vehicles to the road transport activity in the experiment area. **It is a relevant indicator when the policy action is aimed at reducing the number of motorised road freight vehicles on urban roads. A successful action is reflected in a LOWER value of the indicator after the experiment compared to the BAU case.**

DESCRIPTION

This indicator is based on the number of motorised freight vehicles in a sample of road sections.

The unit of measurement of the indicator is **vehicle per lane per hour**.

METHOD OF CALCULATION AND INPUTS

The indicator should be calculated **exogenously** on the required inputs and then coded in the supporting tool**.**

There are two alternative methods of calculation available for this indicator. The two methods distinguish for size of the traffic counts campaign used to collect the information.

METHOD 1	METHOD 2
Number of vehicles observed only in peak time for a sample day	**Number of vehicles observed in the whole day in different days**
It is based on a limited set of data	It is based on a wider set of data
Complexity 	Complexity 
Significance 	Significance 

Method 1

Calculation based on traffic counts in peak time for one day

Significance: **0.50**

INPUTS

The input needed to compute this indicator is:

a) A set of traffic counts on a sample of road sections in the experiment area.

The experiment would be reflected in the modification of the observed number of motorised freight vehicles **in the same road sections**. The modification would be the result of one or more interventions directly or indirectly affecting the number of motorised freight vehicles used in the experiment area.

METHOD OF CALCULATION

The indicator should be computed according to the following steps:

- **Definition of the set of road sections** where counting vehicles. The selection of sections should be made according to the following rules:
  - Sections should include the major roads in the experiment area.
  - If the experiment includes interventions on some specific roads, counts should be made in at least some of these roads as well as in at least some roads that could be used as alternative by motorists.
  - If part of the experiment consists of including some roads in a pedestrian area where motorised vehicles are forbidden, these roads should NOT be included in the sample.
  - If part of the experiment consists of restricting access to some roads (e.g. low emissions zone) these roads can be included in the sample, but a sufficient number of roads outside the restricted area should also be included.

  If in the experiment area there is already a traffic counting system in place, the data from the system can be used, but the requirements above should be respected anyway.

- **Measurement of the number of motorised freight vehicles on each section**. The measurement should be made in at least 2 peak time hours of a working day.

- **Quantification of the indicator**. The indicator is the average number of measured freight vehicles per lane and per hour computed using all sections.

EQUATIONS

The equation that should be applied to quantify the indicator is:

$$MotorFrght = \frac{\sum_s \sum_h \frac{FrVeh_s^h}{lanes_s}}{S * H}$$

Where:

$FrVeh_s^h$ = Number of motorised vehicles counted in road section *s* in hour *h*

$lanes_s$ = Number of lanes of road section *s*

S = Total number of road sections

H = Number of hours monitored

Method 2

Calculation based on traffic counts in the whole day for more days

Significance: **1.00**

INPUTS

See Method 1.

METHOD OF CALCULATION

See Method 1.

The difference with respect to Method 1 is in the second step, as there are additional requirements regarding the period of the counts. The measurement should be made continuously from 6 to 22 in at least 3 working days.

EQUATIONS

The equation that should be applied to quantify the indicator is:

$$CongInd = \frac{\sum_s \sum_d \sum_h \frac{{}^dFrVeh_s^h}{lanes_s}}{S * D * H}$$

Where:

${}^dFrVeh_s^h$ = Number of motorised vehicles counted in road section *s* in hour *h* of day *d*

$lanes_s$ = Number of lanes of road section *s*

S = Total number of road sections

H = Number of hours monitored

D = Number of days monitored

ALTERNATIVE INDICATORS

This indicator measures of the contribution of motorised freight vehicles to the road transport activity within the experiment area by counting vehicles on a sample of roads. In contrast, alternative indicator **TRA_FC_MA3** estimates vehicle-kilometres travelled by road freight vehicles in the experiment area using traffic simulation models.

This indicator (**TRA_FC_MA1**) is computed based on data obtained through direct observation, avoiding the need to set up traffic models. Data collection is conducted using equipment such as detection loops, cameras, or it can be performed manually. In cities where classified traffic counts are already conducted regularly, the additional effort to compute this indicator is minimal, as the necessary data is already available. Furthermore, this indicator may be best suited for local analyses or specific corridors since it relies on a limited sample of roads. It does not provide information on travel distances and therefore cannot estimate total freight movement. Meanwhile, **TRA_FC_MA3** relies on traffic models, which can add complexity unless traffic models are already in place in the city. Traffic models account for the entire road network rather than a sample of roads, making **TRA_FC_MA3** better suited for system-wide analyses; it provides a measure of total freight movement within the experiment area, offering a more comprehensive understanding of freight traffic. Nonetheless, it should be noted that transport models have inherent limitations and may not fully capture the complexity of real-world traffic conditions.

TRA_FC_MA2 measures the share of deliveries made by non-motorised vehicles. This alternative indicator is suitable to assess projects aiming to shift freight traffic from motorised to non-motorised vehicles. An increase in deliveries made by non-motorised vehicles may be assumed to imply a reduction in motorised freight traffic in the experiment area.

It should be noted that the data required to compute this indicator could be sourced from the same traffic counts used for **TRA_FC_CG2**, provided that classified counts are taken.