Cane Transport Fleet: Trips and Vehicles

Daily trips and vehicles needed to haul the crush from payload, turnaround time, working hours and availability, rounded up to whole vehicles.

Method: Haulage arithmetic: trips = daily tonnage / payload; vehicles = trips / (trips per vehicle × availability)

Input parameters

Unit system: SI

Parameter	Value	Unit
Cane to deliver per day The daily crush (tonnes per day).	5,000.0	t/d
Payload per trip	10.000	t
Turnaround time per trip (load, haul, unload, return)	4.0000	h
Working hours per day	12.000	h
Fleet availability	85.000	%

Calculated results

Parameter	Value	Unit
Trips per day	500.00	
Whole trips per vehicle per day	3.0000	
Vehicles needed (rounded up)	197.00	
Vehicles needed (exact)	196.08	

Notes for this case

- Each vehicle is credited only with whole trips in the working day; round turnarounds up, not down.

Formula and method

$$N_t = \frac{C_d \cdot 1\,\mathrm{d}}{W}, \quad n = \left\lfloor \frac{H_d}{T} \right\rfloor, \quad N_v = \left\lceil \frac{N_t}{n\,\alpha} \right\rceil$$

Variables

C_d	Cane to deliver per day	kg/s
W	Payload per trip	kg
T	Turnaround time per trip (load, haul, unload, return)	s
H_d	Working hours per day	s
α	Fleet availability	-
N_t	Trips per day	-
n	Whole trips per vehicle per day	-
N_v	Vehicles needed (rounded up)	-
N_f	Vehicles needed (exact)	-

Method and standards

Haulage arithmetic.

Assumptions and limits

- Average turnaround over the day. Each vehicle makes only whole trips in its working day (n is rounded down).
- C_d is the daily tonnage (1 d = 86 400 s).

References

- Haulage arithmetic: trips = daily tonnage / payload; vehicles = trips / (trips per vehicle × availability)

Report details

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Release checks	2 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/sugar-ethanol/cane-preparation/cane-transport-fleet

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.