Takt, cycle time and lead time are different

Calculate takt from net time and demand, distinguish it from observed cycle and lead time, and label missing measurements instead of inventing performance.

Three clocks, three decisions

Fictional assembly planning case: a team has 400 net available minutes and demand for 300 units. Supervisor Bea is asked whether the line is fast enough and whether a customer order can be promised tomorrow. The supplied concept gives no measured cycle time or order lead time.

Your role and the reference condition

Assembly supervisor with the planner and an operator observer.
Normal: Time measures carry a defined start, finish, unit and operating condition before they are compared.
Gap: A planning sheet copies the demand-derived 80 seconds into the actual cycle and order lead-time boxes.

Work within these conditions

1. 400 minutes is declared net production time; do not subtract planned breaks a second time.

2. No observed cycle-time or order lead-time value is present in this worked case.

Fictional teaching case. Supplied observations support the exercise; proposed actions are not verified customer results.

See how the method works

Use three clocks to avoid three different questions becoming one number. Takt expresses the demand interval over a declared available period. Cycle observations describe how a process actually repeats, including its variation. Lead time follows one order through work and waiting from an agreed beginning to an agreed end. In this exercise, 400 available minutes for 300 units gives an 80-second takt. That is a planning reference, not proof that every task can safely be performed in 80 seconds. Investigate gaps in method or capacity and verify the effect on customer elapsed time.

Takt

Available time / customer demand

400 min x 60 / 300 units = 80 seconds per unit. Demand sets the reference.

Cycle time

Observe the actual repeating interval

Observe the repeating completion interval at a defined process. No cycle-time observation is supplied in this example.

Lead time

Follow one item through work and waiting

Follow one item from the declared start to finish, including queues and waiting. No elapsed lead-time observation is supplied.

Method exhibit: Takt, Cycle time, Lead time.

Follow the evidence and decisions

Inspect the supplied case inputs

Measure / input	Supplied value or boundary
Net available time	400 min per planning day
Customer demand	300 units in that day
Takt	To calculate; sec per required unit
Observed cycle	Not supplied; specify repeat-event boundary
Order lead time	Not supplied; specify receipt and completion boundary

01 / Align the planning quantities

Bea checks that the 400 minutes and 300 required units refer to the same planning period and product mix. She converts minutes to seconds before dividing.

Why: Mismatched periods or gross versus net time create a demand rhythm that looks precise but answers the wrong question.

Evidence / check: 400 x 60 = 24,000 available seconds.

02 / Calculate the required rhythm

Divide 24,000 seconds by 300 units and label the result 80 seconds per required unit. Keep it in the planning reference column.

Why: Takt comes from available time and demand. It is not a measurement of how long an operator or order actually took.

Evidence / check: Takt = 80 sec/unit; demand basis and planning day recorded.

03 / Define the cycle observation

Agree a repeatable process event, such as successive completion of the same assembly operation, and plan repeated observations across relevant conditions. Record abnormal events and mix rather than silently discarding them.

Why: A repeatable boundary makes observed cycle data interpretable. A single selected fast cycle cannot establish reliable capacity.

Evidence / check: Cycle-time field remains "not measured"; observation boundary and conditions are named.

04 / Define the customer clock

Trace an identified order from accepted receipt to verified completion, stating whether the unit is working hours or elapsed calendar hours. Include waiting inside that chosen boundary.

Why: Lead time spans the route and can be far longer than the time spent processing. An 80-second takt cannot support a next-day promise.

Evidence / check: Order start/finish timestamps and boundary are still required.

05 / Make only the supported decision

Publish the 80-second demand reference and a measurement plan. Defer claims of achieved rate or delivery promise until cycle variation, route delays and capacity conditions are available.

Why: Separating a known calculation from unknown observations prevents a target from being reported as a result.

Evidence / check: Three named fields: calculated takt, measured cycle, measured order lead time.

Completed timing definitions - missing values retained

Field	Result	Meaning
Available time	24,000 sec/day	Declared net time
Demand	300 units/day	Same period
Takt	80 sec/unit	Required rhythm
Cycle	Not measured	Repeated process-event observation needed
Lead time	Not measured	Identified order start and finish needed

A second plan uses gross time

Another planner supplies 450 minutes including 50 minutes of planned nonproduction time for the same 300 units.

Decision

Use 450 minus 50 = 400 net minutes; the takt stays 80 seconds per unit.

Reasoning

Dividing gross time would give 90 seconds and imply more productive time than the plan provides.

What would change the decision?

Both versions reconcile to 24,000 net seconds.

Practise with a changed case

A changed demand and measured order

Separate fictional case: 360 net minutes, 240 required units; five observed process intervals are 82, 88, 94, 86 and 90 seconds. Order K is accepted Monday at 09:00 and completes Tuesday at 15:00. Use elapsed calendar hours.

Input	Value
Net time / demand	360 min / 240 units
Observed intervals	82, 88, 94, 86, 90 sec
Order K start	Monday 09:00
Order K finish	Tuesday 15:00

Your task

1. Calculate takt and the sample mean cycle interval.
2. Calculate the declared order lead time.
3. Explain why the five observations do not prove reliable capacity against demand.

Use the next page to record your reasoning before reading the answer.

Your practice worksheet

A changed demand and measured order

Net-time conversion

Takt and units

Observed intervals and mean

Order boundary and elapsed time

What remains unverified

Complete your reasoning before turning to the answer. Use the separate learner workbook for group practice.

Check your reasoning and transfer it

1. Takt is 360 x 60 / 240 = 90 sec/unit. The five observed intervals total 440 seconds, so their mean is 88 seconds.

2. Order K spans 30 elapsed calendar hours. That does not mean 30 hours of touch work.

3. One observed interval is 94 seconds, above takt, and five intervals are not a sufficient capability study. State the sample and investigate variation, losses and mix before promising performance.

Suggested completed record

Measure	Calculation / evidence	Result
Takt	21,600 / 240	90 sec/unit
Sample mean	440 / 5	88 sec
Observed range	82 to 94	One interval exceeds takt
Lead time	24 plus 6	30 calendar hours

Plausible wrong turns

1. A target is not an observed cycle time.

2. A mean below takt does not by itself establish reliable delivery.

Evidence of a sound answer

1. Use compatible periods and units.

2. Retain the 94-second observation and explain its implication.

3. Define the lead-time clock explicitly.

Take the learning back to work

Commitment	Agreed follow-through
Owner	Process owner with planning and trained observers
Record	Demand/net-time basis, repeated cycle sheet and order timestamp trace
Review	When demand or time basis changes, and after the agreed observation period
Verification evidence	Traceable definitions, representative observations and a decision consistent with variation
If unresolved	Keep capacity and promise claims provisional; obtain missing timing and route evidence.

Help someone else apply the method

Prepare

1. Calculator and timing-definition sheet
2. Timestamp cards; no stopwatch needed for this desk exercise

Minutes	Activity and coaching prompt
4	Name the clocks Which value can be calculated from the supplied original inputs?
7	Complete the original record Why must two boxes remain unmeasured?
9	Work the changed case Does 88 below 90 settle the capacity question?
5	Plan real observation Which event boundaries and conditions will you record?

Debrief

1. Ask learners to distinguish calendar and working time.
2. Use the gross-time exception to expose double subtraction or missing deductions.

Individual or remote practice

Calculate independently, then explain each result as one sentence containing its unit and boundary.

Connect the method and check its boundaries

Before application

1. Same period and product family
2. Explicit break/uptime convention

Outside this lesson

1. Takt is not measured cycle time
2. Lead time is not the sum of manual work alone

LEI: Takt Time

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Demand-paced available production time per required unit.

Method reference; original OPEX scenario and diagram are synthetic teaching content, not source case results.

Open this lesson and its visual aids