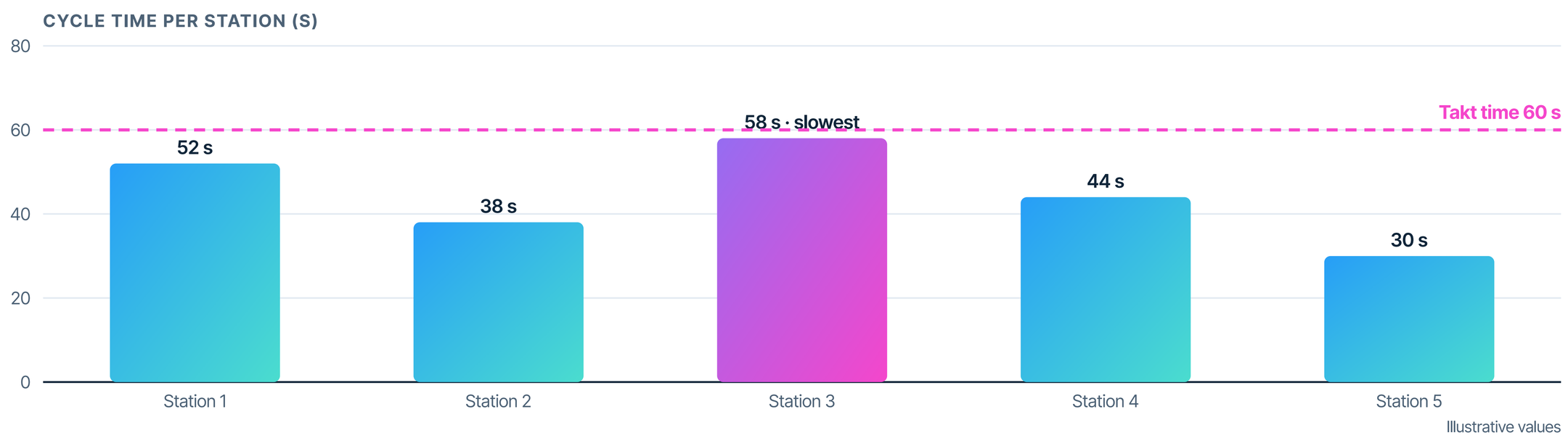
PRODUCTION & MANUFACTURING

# Line Balancing Explained

Line balancing distributes work across stations so each one finishes just below takt time, removing idle time and the overload that limits the line.

## 01 THE CORE MODEL

OPERATOR BALANCE CHART · WORK VS TAKT




### Takt time

The demand pace; every station should finish just below it.

### Work content

Total manual and machine time needed to build one unit.

### Balance efficiency

Work content ÷ (stations × longest station time).

## 02 BALANCED VS UNBALANCED

The slowest station sets the pace; idle time hides at the others.

UNBALANCED — BALANCED

**UNBALANCED LINE**

- Some operators wait in every cycle
- One station close to or above takt
- WIP builds in front of the slowest step

**BALANCED LINE**

+ Work spread evenly, just below takt
+ Fewer operators for the same output
+ Idle time made visible, then removed

## 03 WORKED EXAMPLE

THE FIVE-STATION LINE FROM THE CHART · ILLUSTRATIVE FIGURES

| WORK CONTENT | | TAKT TIME | | MINIMUM STATIONS | | ACTION |
|---|---|---|---|---|---|---|
| 222 s | ÷ | 60 s | = | 3.7, so 4 | → | Move tasks |
| 52 + 38 + 58 + 44 + 30 | | from customer demand | | instead of 5 today | | rebalance to 4 stations |

## 04 MANAGEMENT TAKEAWAYS

**01 — Balance to just below takt**

Leave a small margin at every station to absorb normal variation.

**02 — Split work into small elements**

Small task elements are easier to move between stations.

**03 — Rebalance when demand changes**

A new takt means a new balance and maybe new staffing.

## 05 COMMON MISTAKE

**LIMITATION**

### Balancing on paper times

Planned times often differ from reality. Time-study the actual work before moving tasks.