



USER MANUAL

CostCalc Pro

Industrial cost calculation and analysis — cost accounting:
purchase costs, production costs, cost of goods sold, margins,
variances, profitability and decision support.

Version 1.0.0

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Overview

CostCalc Pro is a **cost-accounting** application that **automatically and accurately computes the cost of the goods manufactured** by an industrial company. It applies the analysis-centre (homogeneous-section) method and full (absorption) costing, and derives from it the margins, the variances against standard costs, the profitability and a set of decision-support simulators.

The module covers the whole cost-management need:

Purchase costs

Materials valued at weighted-average cost (WAC), with allocation of indirect procurement overheads.

Production costs

Materials consumed (bill of materials), direct labour (routing) and workshop overheads (cost units).

Cost of goods sold

Production cost of goods sold + distribution + administration + direct expenses.

Margin analysis

Analytical result, mark-up and margin rates, per product and overall.

Variance analysis

Direct costs (quantity variance + price variance); indirect costs (three-variance model).

Profitability tracking

Cost-volume-profit: break-even, safety margin & index, operating leverage, break-even date; ABC ranking.

Decision support

Special order, make-or-buy, floor price and recommended selling price.

Two ways in

Desktop app (recommended) and a web / API interface for remote browser access.

Who is this manual for?

Management accountants, cost controllers, executives and production managers who want to know the true cost of each product and steer profitability. No programming skills are required for everyday use.

2 Getting started & sign-in

2.1 Launch the desktop app (recommended)

From the project root, simply run:

```
# Desktop application  
python main.py
```

The application opens the sign-in screen and then goes straight to the **Cost of goods (Coût de revient)** module. The calculation engine relies only on Python's standard library — no external dependency is needed for the calculations.

2.2 Sign in

Enter your username and password. On the very first launch, an administrator account is created automatically:

Username	Password	Role
admin	admin123	System administrator

Security — do this immediately
Change the admin123 password on first sign-in (Users / My account). This account has access to all data.

2.3 Currency and language

The default currency is the **CFA Franc (FCFA)**; the euro, the US dollar and other currencies are available in the settings. All amounts in the module are shown in the chosen currency. The interface is available in several languages (French, English, Spanish, Arabic).

Good to know
The cost-accounting schema (tables prefixed ca_) is created automatically on first use. There is nothing to install on the database side.

3 The workspace — the 7 tabs

In the sidebar, the **ANALYSIS** section contains the “ **Cost of goods**” entry. The screen consists of a header, a toolbar with the **period selector**, and then a set of tabs.

3.1 The toolbar (top of the screen)

Control	Purpose
Period	Drop-down that selects the active analysis period. Every calculation applies to this period.
Refresh	Recomputes and refreshes the current tab.
New period	Creates a period (code + label, e.g. “2026-06 — June 2026”).
Standard centres	Creates a ready-made set of typical analysis centres in one click.

3.2 The tabs

SummaryAllocationProfitabilityVariancesDecisionsDataConfiguration

Tab	What it contains
Summary	Overview: 4 key indicators + the three cost tables (purchase, production, cost of goods & margins).
Allocation	Indirect-cost allocation table (primary, secondary, cost per cost unit) and a balance check.
Profitability	Cost-volume-profit analysis (break-even, safety margins, leverage) and ABC ranking of products.
Variances	Variance analysis for one product: materials and direct labour (actual vs standard costs).
Decisions	Three simulators: special order, make-or-buy, floor / recommended price.
Data	Period data entry: overheads, activity, purchases, production, sales.
Configuration	Reference data: periods, analysis centres, labour rates, BOMs & routings.

4 Recommended workflow

Follow this logical order. The **Configuration** and **Data** tabs are filled in first; the analysis tabs are then consulted.

Step	Action	Where
1	Create the analysis centres ("Standard centres" button or your own centres) and, where needed, the secondary allocation keys .	Configuration → Centres
2	Enter the labour rates (hourly rates).	Configuration → Labour rates
3	For each finished product, define the bill of materials (components) and the routing (operations: labour time, cost units).	Configuration → BOMs
4	Create the analysis period (month, quarter...).	Toolbar → New period
5	Enter the period data : overheads (flagging the fixed ones), activity, purchases, production, sales.	Data
6	Steer : review the summary, allocation, profitability, variances and the simulators.	Summary → Decisions

5 Configuration (reference data)

The **Configuration** tab groups the stable reference data that does not change every period: centres, labour rates, bills of materials, routings and periods.

5.1 Analysis centres

An analysis centre groups homogeneous indirect costs. Each centre has a **type** and a **cost unit** (the unit that measures its activity). The **Standard centres** button creates the following ready-to-use set:

Code	Label	Type	Cost unit
ADM	Administration / Management	administration	100 of sales
ENT	Maintenance	auxiliary	maintenance hour
ENERG	Energy	auxiliary	kWh
APPRO	Procurement	procurement	kg purchased
ATEL1	Production workshop	production	machine-hour
DIST	Distribution	distribution	unit sold

The types drive each centre's role in the cascade: **auxiliary** centres are fully re-allocated to the other centres; the **main** centres (procurement, production, distribution, administration) charge their costs to products through their cost unit.

5.2 Secondary allocation keys

When an auxiliary centre serves other centres, define the **allocation key** (the percentage sent to each recipient). The software handles **reciprocal services** (two auxiliaries serving each other) by solving a system of linear equations — the result is **exact**, with no approximation or manual iteration.

5.3 Labour rates

Enter the **hourly rates** of direct labour. These rates are applied to the times declared in the manufacturing routings to value the direct labour.

5.4 Bills of materials & routings

For each manufactured product:

- **Bill of materials (BOM)** — the list of components and, for each, the required quantity plus an optional **loss percentage**. A component can itself be a semi-finished product: the software first computes the cost of the sub-assemblies, then that of the final product.
- **Routing** — the manufacturing operations: for each operation, the **centre** involved, the **labour time** (× hourly rate) and the **number of cost units** consumed (× the centre's cost-unit rate).

Two new article types

The module introduces the types `produit_fini` (finished product) and `produit_semi_fini` (semi-finished product). They are added to your existing article catalogue automatically and safely (the operation fully preserves your data and has no effect if already applied).

5.5 Periods

A period (month, quarter, financial year...) isolates one set of cost data. Create it via **New period** (code + label, e.g. `2026-Q2` — “2nd quarter 2026”). The active period is chosen in the toolbar.

6 Entering the period data

The **Data** tab has five sub-tabs. Each provides a table with *Add* and *Delete* buttons.

Sub-tab	What to enter
Overheads	The primary indirect costs per centre (amount). Tick “fixed” for structural costs: this information feeds the break-even calculation.
Activity	For each main centre, the number of cost units actually used (and the normal activity, useful for indirect-cost variances).
Purchases	The material purchases : quantity, unit price, any direct expenses, and opening stock (quantity + value) for the WAC calculation.
Production	The quantities produced per product, the opening stock, and any direct distribution expenses.
Sales	The quantities sold and the unit selling price per product.

Entry tip

Carefully flag the **fixed** overheads: they determine the quality of the break-even point and the operating leverage computed in the Profitability tab. Fill in the **normal activity** of the centres if you want to use the indirect-cost variance analysis.

7 Reading the results

7.1 Summary tab

Four key indicators summarise the period: **Sales (turnover)**, **Cost of goods sold**, **Analytical result** and **Overall mark-up rate**. Below them, three tables describe the full cascade:

- **Material purchase costs (WAC)** — for each material: quantity, purchase + expenses, indirect procurement overheads, total cost and the **WAC** (weighted-average unit cost).
- **Production costs** — for each product: materials consumed, direct labour, production overheads and the **unit production cost**.
- **Cost of goods & margins** — for each product sold: quantity sold, turnover, cost of goods sold, **analytical result** and the **mark-up rate**.

7.2 Allocation tab

This table shows how the indirect costs flow, centre by centre, down to the cost-unit rate:

Column	Meaning
Primary	Costs assigned directly to the centre.
Received (sec.)	Amounts received from the auxiliary centres (secondary allocation).
Total	Centre total after secondary allocation.
No. of units	Number of cost units of the centre (from the activity data).
Cost per unit	Total ÷ number of units — the cost of one cost unit.

The indicators at the top show the **total overheads**, the amount **allocated to the main centres**, the share of **fixed** costs, and a balance **check** (“Balanced” means nothing is lost in the allocation).

Reciprocal services

When two auxiliary centres serve each other, the amount to allocate for each is computed by an exact linear system: cost conservation is guaranteed (the check stays balanced).

7.3 Profitability tab

An overall **cost-volume-profit** analysis. Fixed costs come from the overheads flagged as “fixed”; variable costs are derived from the total cost of goods sold.

Indicator	Interpretation
Contribution margin (CM)	Sales – variable costs. Contribution towards covering the fixed costs.
CM rate	CM ÷ sales (in %).
Break-even point	Sales level above which the result turns positive (fixed costs ÷ CM rate).
Safety margin	Sales – break-even: the drop in activity that can be absorbed before losing money.
Safety index	Safety margin ÷ sales (in %).
Operating leverage	CM ÷ result: sensitivity of the result to a change in activity.
Break-even date (days)	Day of the period on which the break-even point is reached.

The **ABC (Pareto) ranking** sorts products by turnover and assigns a class: **A** (up to 80 % of cumulative turnover), **B** (80–95 %) and **C** (the rest). It highlights the small number of products that make up most of the turnover.

7.4 Variances tab

Compare **actual costs against standard (pre-established) costs** — standards come from the bills of materials, routings and standard prices. Pick a finished product and click **Analyse**:

- **Material variances** — for each component: standard quantity, actual quantity, **quantity variance**, **price variance** and total variance.
- **Direct labour variance** — the same breakdown, aggregated at product level (standard / actual time, quantity variance, rate variance).

How to read variances

An actual cost **above** the standard is **unfavourable**; an actual cost **below** is **favourable**. An internal check systematically verifies that *quantity variance + price variance = total variance*.

7.5 Decisions tab

Three independent simulators. Fill in the fields, click **Calculate**; the recommended decision is shown in green (favourable) or red (unfavourable).

Simulator	Question & principle
Special order	Should a discounted order be accepted? The decision is based on the contribution margin (fixed costs already being covered). Accept if the margin generated is positive.
Make or buy	Produce in-house or subcontract? A comparison of the relevant cost: external purchase cost vs (internal variable cost + avoidable specific fixed cost).
Floor / recommended price	Short-term floor price (= variable cost) and long-term floor price (= full cost), plus a recommended selling price for a target margin.

8 Accounting method & formulas

CostCalc Pro applies the **full-costing** method by analysis centres. Here are the key formulas used by the engine.

Indirect-cost allocation

Cost-unit rate = Main-centre total ÷ Number of cost units

Secondary allocation — auxiliaries are re-allocated to the main centres; reciprocal services are solved by a linear system $(I - K) \cdot D = \text{primary costs}$.

Purchase cost & WAC

Purchase cost = Purchase price + Direct expenses + Share of procurement overheads (allocated in proportion to purchase value).

WAC = (Inflow value + Opening-stock value) ÷ (Inflow quantity + Opening-stock quantity)

Production cost

Production cost = Materials (BOM × WAC, losses included) + Labour (routing × rate) + Production overheads (cost units × cost-unit rate)

Cost of goods sold & result

Cost of goods sold = Production cost of goods sold + Distribution overheads + Administration overheads + Direct expenses

Analytical result = Sales – Cost of goods sold

Mark-up rate = Result ÷ Sales · **Margin rate** = Result ÷ Cost of goods sold

Variances (standard costing)

Direct costs (materials or labour):

Quantity variance = (Actual qty – Standard qty) × Standard cost

Price variance = (Actual cost – Standard cost) × Actual qty

Indirect costs — three-variance model: Budget + Activity/Volume + Efficiency = Total variance.

Profitability (cost-volume-profit)

Break-even = Fixed costs ÷ CM rate · Leverage = CM ÷ Result · Break-even date (days) = Break-even ÷ Sales × days in period

9 Web & API access

The same calculation engine is exposed by a server for remote browser access. To start it:

```
# From the project root
python -m api.run
# or
uvicorn api.app:app --host 0.0.0.0 --port 8000
```

- Module web interface: <http://localhost:8000/cout-revient>
- Interactive API documentation: <http://localhost:8000/docs> (look for the “cost of goods” tag).

The API (prefix `/api/ca`) requires an authentication token. A few of the main endpoints:

Method	Endpoint	Purpose
POST	<code>/api/ca/init</code>	Create / migrate the schema.
GET	<code>/api/ca/repartition/{period}</code>	Allocation table.
GET	<code>/api/ca/couts/{period}</code>	Full cost cascade.
GET	<code>/api/ca/rentabilite/{period}</code>	CVP analysis + ABC ranking.
POST	<code>/api/ca/ecarts/{period}/{product}</code>	Variance analysis for a product.
POST	<code>/api/ca/decision/...</code>	Decision-support simulators.

The full list of endpoints (periods, centres, rates, BOMs, routings, overheads, activity, purchases, production, sales, standard prices) is available in the interactive documentation at </docs>.

10 Windows packaging (executable)

To distribute the application as a standalone Windows executable:

```
REM 1) Build the application
python packaging\build.py --folder
REM 2) Compile the installer with Inno Setup
REM    Open packaging\installer.iss then "Compile"
```

The result is an installer `CostCalcPro_Setup_1.0.0.exe`. For a single file: `python packaging\build.py → dist\CostCalcPro.exe`. Running from source (`python main.py`) works on Windows, macOS and Linux.

11 Glossary

Term	Definition
Analysis centre	A grouping of homogeneous indirect costs, measured by a cost unit.
Cost unit	The unit that measures a centre's activity (machine-hour, kg purchased, unit sold...).
WAC	Weighted-average cost — a stock-valuation method.
Bill of materials (BOM)	The list of components and quantities needed for a finished product.
Routing	The sequence of manufacturing operations (labour time, cost units per centre).
Direct labour	Labour directly attributable to production.
Contribution margin	Sales — variable costs.
Standard cost	The expected (pre-established) cost, used as the reference for variance analysis.
Analytical result	Sales — cost of goods sold, per product or overall.

12 FAQ & troubleshooting

A tab stays empty?

Check that a **period is selected** in the toolbar and that the matching data has been entered (an empty summary usually means no sale has been recorded).

The allocation check shows “Off balance!”

A secondary allocation key probably does not total 100 % for an auxiliary centre, or a centre receives costs without being re-allocated. Check the keys in Configuration → Centres.

The break-even point looks inconsistent?

Make sure you **ticked “fixed”** for structural costs: without this distinction, the fixed / variable split — and therefore the break-even point — is not reliable.

A production cost comes out as zero?

The product probably has an incomplete BOM or routing, or a component whose cost could not be resolved (a material not purchased during the period, or a missing sub-assembly). Complete the configuration and refresh.

CostCalc Pro — Industrial Cost Calculation & Analysis · Version 1.0.0. User manual (English edition). The application's original code comments and labels are in French; the interface is available in several languages.