**Serving your process needs**
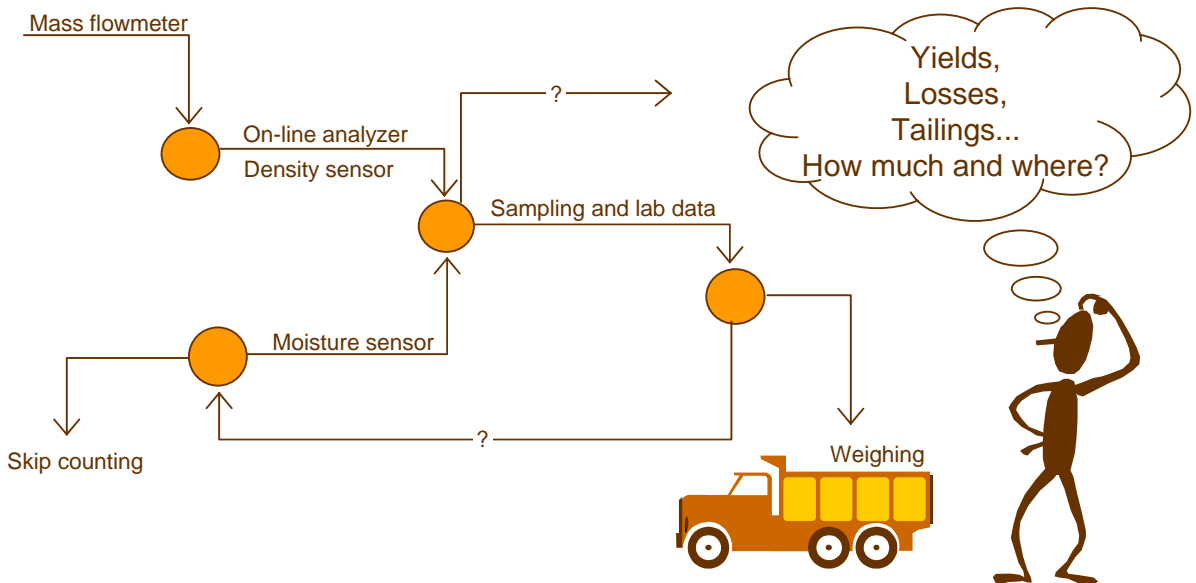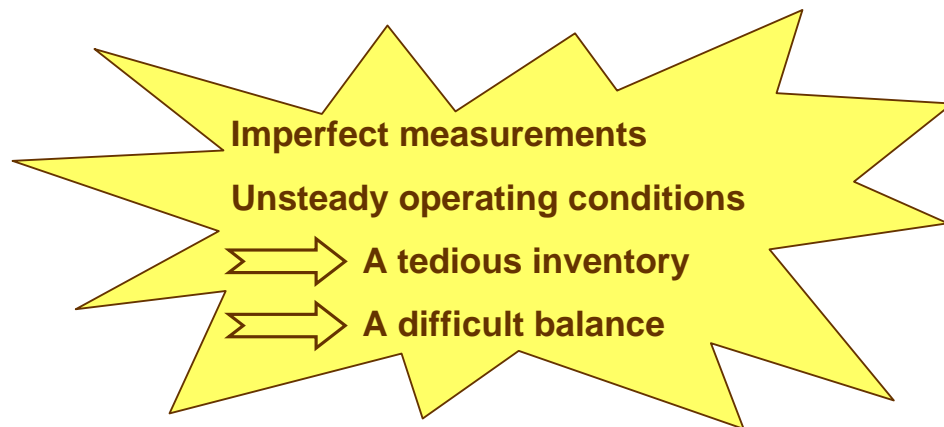
# Caspeo™ adjusts your material balance

## You equilibrate you financial balance?

## Why not your material balance?

**Imperfect measurements**

**Unsteady operating conditions**

⟹ **A tedious inventory**

⟹ **A difficult balance**

Mass flowmeter

On-line analyzer
Density sensor

Sampling and lab data

?

Moisture sensor

Skip counting

?

Weighing

Yields,
Losses,
Tailings...
How much and where?

**Caspeo offers you a solution**

Caspeo™
✉ BRGM Campus
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45060 Orléans Cedex 2, France
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# Material balancing: a production tool

**A solution based upon the BILCO$^{TM}$ software**

## Principle

- To derive a coherent material balance from all the available data (measurements, analyses, estimates) for all the process streams
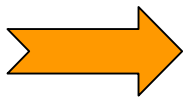
## Results

- Coherent and more reliable data
- Non-measured data availability
- Validated operating parameters

## Benefits

➡ **Productivity improvement due to a better process management**

➡ **Increased reactivity thanks to reliable and correlated performance indicators**

## Application fields

- Production snapshot
- Water balance
- Estimation of losses
- Supply validation
- Discharge quantity and quality evaluation
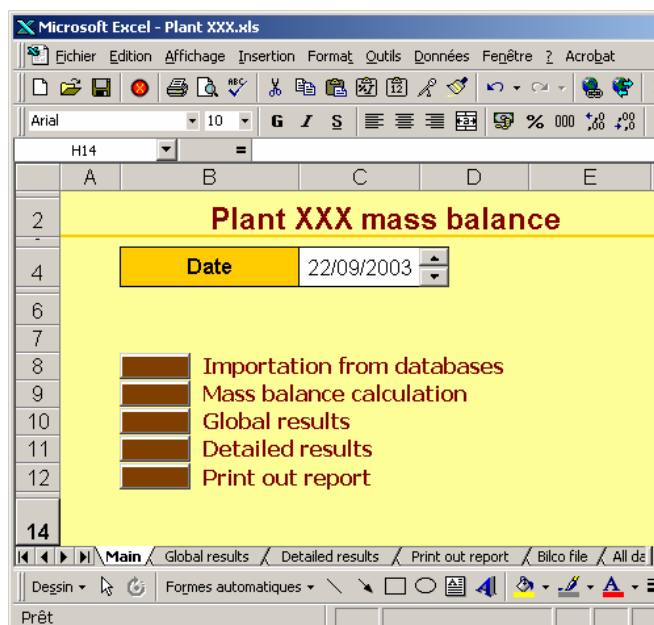- Intermediate inventory assessment

# A complete range of services

## From preliminary audit...

- Operation review leading to recommendations on measurement, sampling and data management

## … to the installation of on-line material balancing systems,

- Interfacing of the BILCO software with data acquisition systems and/or laboratory databases
- Development of databases
- On-line determination of operating parameters such as residence time, yields, grades, consumption.



**Microsoft Excel - Plant XXX.xls**

**Plant XXX mass balance**

| Date | 22/09/2003 |

Importation from databases
Mass balance calculation
Global results
Detailed results
Print out report

**Mass balance - Process parameters**

septembre 22, 2003

*Reactors*

**From Feed tank**

| | | | |
|---|---|---|---|
| Feed rate | 167.90 | tpd | 7.00 t/h |
| % solids | 54.87 | % | |
| Co | 1.37 | % | |
| S | 40.75 | % | |
| Co | 0.28 | gpl | |
| SO4 | 15.85 | gpl | |
| Cobalt Contained in Feed | 2.33 | tpd | 97.19 kg/h |

**Primary reactor feed**

| | | |
|---|---|---|
| % solids | 18.09 | % solids |
| Co | 1.39 | % |
| S | 38.24 | % |
| Co | 2.67 | gpl |
| SO4 | 26.11 | gpl |

**Limestone addition**

| | | | |
|---|---|---|---|
| Feed rate | 68.58 | tpd | 2.86 t/h |
| % solids | 47.9 | | |
| Maximum CO2 available in reactors | 17 256 | m3/d | 719.01 m³/h |
| | 28 | t/d | 1.15 t/h |

**Residence time**

| | | |
|---|---|---|
| In primaries | 4.49 | days |
| In secondaries | 1.45 | days |

| | | |
|---|---|---|
| **Sulphide oxidation rate** | 82.24 | % |
| **Recovery of Co in solution** | 78.95 | % |

**Gas balance**

| | | |
|---|---|---|
| Air feed rate | 53229.77 | m3/h |
| Average per reactor | 13307.44 | m3/h |

## going through

- Training of the production management team
- Customer tailored solutions

## and much much more...

# BILCO™ a multi-field tool

**Caspeo** offers you a complete data analysis system by material balance based on the BILCO™ software.

BILCO is a BRGM tool. It is an interactive, quick and statistically accurate software for solving material balance problems in a vast number of applications. BILCO can also handle all types of balancing problems that involve chemical analysis (fitting up to 100% and estimating accuracy of analyses), mineralogy (fitting with chemistry), planning sampling strategies, mixing and blending and more

BILCO 3.0 can communicate with most applications using a COM (Component Object Modeling) interface.



The COM interface can be used to:

- automate data import and export, e.g. transfer some experimental values from an Excel spreadsheet to BILCO, then calculate the material balance and transfer results from BILCO back to another Excel spreadsheet

- link several material balance calculations for sensitivity analysis (effect of experimental values and errors on material balance results)

- improve the quality of real-time process data through automatic material balance calculation
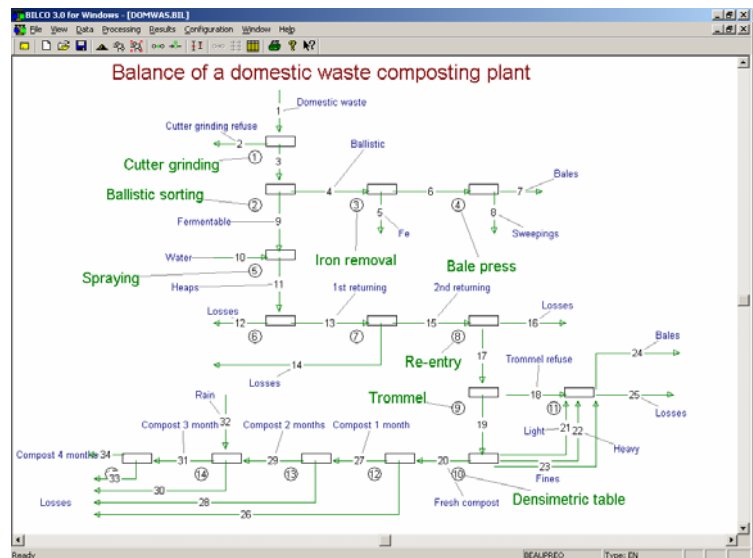
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