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Bachelor of Commerce (B2001) | Level 2 • Part B Major | Monash University

Introduction to Management Accounting

Course Code: ACC2200 • Module 2 Notes

Chapter 1: Product Costing Architecture and Manufacturing Overhead Allocation

1.1 Strategic Rationale and AASB 102 Compliance

Product costing systems measure the cost of manufacturing tangible goods or delivering client services. Management relies on accurate unit product costs for three distinct organisational purposes: external financial reporting (valuing Work in Process and Finished Goods inventories on the Balance Sheet and determining Cost of Goods Sold on the Statement of Profit or Loss in accordance with **AASB 102 Inventories**), tactical pricing and tender bidding (ensuring quoted prices recover full production and life-cycle outlays), and strategic profitability management (evaluating which products, contracts, or clients generate sustainable economic margins).

Under AASB 102, the cost of manufactured inventories must encompass all costs of purchase, costs of conversion (direct labour and a systematic allocation of fixed and variable production overheads), and other costs incurred in bringing inventories to their present location and condition. Non-production overheads—such as corporate head-office salaries, abnormal material wastage, and selling expenses—are explicitly excluded from inventory valuation and recognised as period expenses.

1.2 Spectrum of Product Costing Systems

Organisations select a costing system that mirrors their physical transformation workflow. At opposite ends of the spectrum sit **job costing** and **process costing**, linked in practice by **hybrid (operation) costing**.

Feature	Job Costing System	Process Costing System	Hybrid (Operation) Costing
Production Output	Distinct, customised units or small batches built to client specification.	Large volumes of identical, homogeneous units produced continuously.	Batches of standard designs sharing common conversion steps but differing materials.
Cost Accumulation Object	Individual job, contract, or client engagement (Job Cost Sheet).	Each sequential processing department or cost centre per time period.	Materials traced to batches (jobs); conversion costs averaged by operation.
Unit Cost Formula	Total Job Cost divided by units in that specific job.	Departmental Costs divided by Equivalent Units of Production (EUP).	Batch Material Cost per unit plus Operation Conversion Cost per unit.
Australian Industry Examples	Commercial construction, naval shipbuilding (Henderson WA), legal & audit engagements.	Dairy processing (Gippsland), alumina refining (Gladstone), craft beverage canning.	Custom automotive interiors, upholstered furniture, specialty footwear manufacturing.

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1.3 Actual Costing Versus Normal Costing

While Direct Materials and Direct Labour are directly traceable to jobs or departments as actual costs are incurred, Manufacturing Overhead (MOH) cannot be traced economically to specific units. Furthermore, waiting until the end of the financial year to compute an actual annual overhead rate creates unacceptable reporting delays, whereas computing actual monthly overhead rates produces volatile unit costs because fixed costs (such as plant insurance) and seasonal expenses (such as winter heating or annual shutdown maintenance) fluctuate independently of monthly production volume.

To deliver timely, normalised unit costs throughout the year, most Australian manufacturers employ **normal costing**, which assigns Direct Materials and Direct Labour at actual incurred cost, but applies Manufacturing Overhead using a **Predetermined Overhead Rate ($POHR$)** calculated prior to the start of the financial year:

$$POHR = \frac{\text{Estimated Annual Manufacturing Overhead}}{\text{Estimated Annual Cost-Driver Activity}}$$

Where:

- $POHR$: Predetermined Overhead Rate expressed in AUD per unit of the allocation base (e.g., per machine hour or direct labour hour).
- Estimated Annual Manufacturing Overhead: Budgeted total fixed and variable manufacturing overhead for the upcoming year.
- Estimated Annual Cost-Driver Activity: Budgeted annual volume of the selected allocation base (cost driver), ideally measured at practical capacity or normal capacity under AASB 102.

During the period, overhead is applied to jobs or departments based on the actual quantity of the cost driver consumed:

$$MOH_{\text{applied}} = POHR \times \text{Actual Cost-Driver Activity Used}$$

Where:

- MOH_{applied}: Manufacturing overhead debited to Work in Process Inventory during the period.
- $POHR$: Predetermined Overhead Rate established at the start of the year.
- Actual Cost-Driver Activity Used: Actual machine hours, direct labour hours, or direct labour dollars recorded on active jobs.

1.4 Plant-Wide Versus Departmental Overhead Rates

Selecting an appropriate cost driver relies on the **cause-and-effect criterion**—identifying the operational variable whose variation physically drives overhead consumption. A single **plant-wide** $POHR$ is simple and inexpensive, but it severely distorts product costs whenever a plant contains

multiple departments with differing capital intensities (e.g., an automated CNC Machining department versus a labour-intensive Hand Assembly department) and products consume departmental resources in unequal proportions. Using separate **departmental overhead rates** aligns each department's overhead pool with its true underlying cost driver.

Worked Example 2.1: Plant-Wide Versus Departmental Overhead Rates

Ballarat Industrial Pumps Pty Ltd operates two production departments: Machining (automated) and Assembly (manual). Budgeted annual data are as follows:

Budget Parameter	Machining Dept	Assembly Dept	Total Plant
Budgeted Manufacturing Overhead	$720,000	$280,000	$1,000,000
Budgeted Direct Labour Hours (DLH)	8,000 DLH	32,000 DLH	40,000 DLH
Budgeted Machine Hours (MH)	30,000 MH	5,000 MH	35,000 MH

Consider two jobs completed during July: **Job A (Heavy Impeller)** requires 40 MH and 5 DLH in Machining, plus 2 MH and 15 DLH in Assembly (total 20 DLH). **Job B (Manual Valve Kit)** requires 5 MH and 4 DLH in Machining, plus 1 MH and 16 DLH in Assembly (total 20 DLH).

Step 1: Plant-Wide $POHR$ (Direct Labour Hours)

- $POHR_{\text{plant}} = \frac{1{,}000{,}000}{40{,}000\ \text{DLH}}$ = $25.00 per DLH.
- Because both Job A and Job B consume 20 total DLH, the plant-wide system assigns identical overhead of 20 × $25.00 = $500.00 to each job.

Step 2: Departmental Rates (MH in Machining; DLH in Assembly)

- $POHR_{\text{Machining}} = \frac{720{,}000}{30{,}000\ \text{MH}}$ = $24.00 per MH.
- $POHR_{\text{Assembly}} = \frac{280{,}000}{32{,}000\ \text{DLH}}$ = $8.75 per DLH.
- **Job A Overhead:** (40 MH × $24.00) + (15 DLH × $8.75) = $960.00 + $131.25 = $1,091.25.
- **Job B Overhead:** (5 MH × $24.00) + (16 DLH × $8.75) = $120.00 + $140.00 = $260.00.

The plant-wide rate drastically under-costed the machine-intensive Heavy Impeller ($500.00 vs $1,091.25) while over-costing the labour-intensive Manual Valve Kit ($500.00 vs $260.00), risking margin erosion on Heavy Impellers and lost tenders on Manual Valve Kits.

Chapter 2: Job Costing Mechanics, Source Documents and Overhead Disposition

2.1 Source Documents and Subsidiary Ledger Control

In a job costing environment, the central accounting record is the **Job Cost Sheet**, which forms a subsidiary ledger supporting the general ledger Work in Process (WIP) Inventory control account. Each open job has its own job cost sheet accumulating three cost streams from verified source documents:

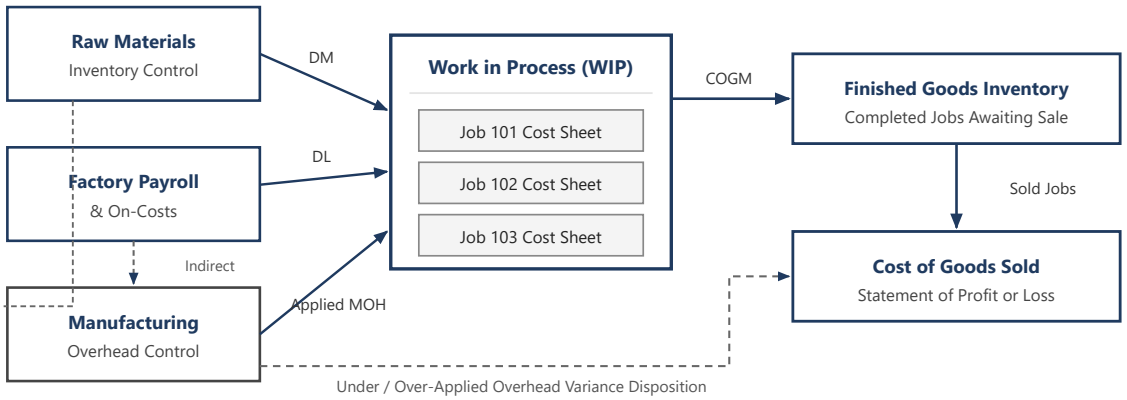
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- **Materials Requisition Form:** Authorises the storekeeper to release raw materials to the factory floor, specifying job number, item codes, quantities, and unit costs. Direct materials are posted to individual job cost sheets; indirect materials are debited to the Manufacturing Overhead Control account.
- **Employee Time Ticket (or Electronic Timesheet):** Captures hours worked by each technician across specific job numbers or indirect tasks (e.g., machine maintenance, cleaning). Direct labour is traced to individual jobs; indirect labour is charged to Manufacturing Overhead Control.
- **Predetermined Overhead Application Log:** Records actual cost-driver consumption (e.g., machine hours logged) on each job and applies overhead via $POHR$.

2.2 Double-Entry Cost Flows Across Inventory Accounts

Every manufacturing transaction follows a disciplined path through general ledger inventory and clearing accounts before reaching Cost of Goods Sold:

1. **Raw Materials Purchase:** Debit *Raw Materials Inventory*; Credit *Accounts Payable / Cash*.
2. **Materials Issuance:** Debit *Work in Process Inventory* (for direct materials) and Debit *Manufacturing Overhead Control* (for indirect materials); Credit *Raw Materials Inventory*.
3. **Factory Labour Incurred:** Debit *Work in Process Inventory* (direct labour) and Debit *Manufacturing Overhead Control* (indirect labour); Credit *Wages & Superannuation Payable*.
4. **Actual Overhead Incurred:** Debit *Manufacturing Overhead Control*; Credit *Accumulated Depreciation, Accounts Payable, Prepaid Insurance, Cash*.
5. **Overhead Applied to Production:** Debit *Work in Process Inventory*; Credit *Manufacturing Overhead Applied* (or directly to the credit side of Manufacturing Overhead Control).
6. **Completion of Jobs:** Debit *Finished Goods Inventory*; Credit *Work in Process Inventory* for the total accumulated cost of completed jobs.
7. **Sale of Finished Goods:** Debit *Accounts Receivable / Cash* and Credit *Sales Revenue*; simultaneously Debit *Cost of Goods Sold* and Credit *Finished Goods Inventory*.



2.3 Under-Applied and Over-Applied Overhead

Because $POHR$ relies on estimated annual overhead and estimated annual activity, actual Manufacturing Overhead incurred during the year almost never equals applied Manufacturing Overhead:

$$\text{Overhead Variance} = MOH_{\text{actual}} - MOH_{\text{applied}}$$

Where:

- MOH_{actual}: Actual indirect manufacturing costs debited to Manufacturing Overhead Control.
- MOH_{applied}: Total manufacturing overhead credited via $POHR \times \text{Actual Driver Activity}$.
- If $MOH_{\text{actual}} > MOH_{\text{applied}}$, overhead is **under-applied** (a debit balance remains in Overhead Control, meaning jobs were under-costed).
- If $MOH_{\text{actual}} < MOH_{\text{applied}}$, overhead is **over-applied** (a credit balance remains in Overhead Control, meaning jobs were over-costed).

At year-end, the temporary Manufacturing Overhead Control account must be closed to zero using one of two methods:

1. **Direct Write-Off to Cost of Goods Sold:** When the variance is immaterial, the entire under-applied (debit) balance is added to COGS (or an over-applied credit balance is subtracted from COGS).
2. **Proration Across Ending Accounts:** When the variance is material under AASB 102, it is allocated proportionally across ending *Work in Process*, ending *Finished Goods*, and *Cost of Goods Sold* based on either their unadjusted total balances or, more accurately, the applied overhead component embedded inside each account.

Worked Example 2.2: Job Costing and Overhead Disposition

Bayside Marine Engineering Pty Ltd builds custom aluminium patrol hulls in Port Adelaide. At the start of the financial year, management budgeted manufacturing overhead of $640,000 and 16,000 direct labour hours ($POHR$ = $640,000 / 16,000 = $40.00 per DLH). During the year, actual direct labour hours worked totalled 15,400 DLH, and actual manufacturing overhead incurred was $652,000.

At 30 June, unadjusted ending account balances (and the applied overhead embedded within each) were:

Account	Unadjusted Balance (AUD)	Applied Overhead Embedded (AUD)	Share of Applied Overhead
Work in Process Inventory (Job 412)	$92,400	$30,800 (770 DLH)	$30,800 / $616,000 = 5.00%
Finished Goods Inventory (Job 409)	$277,200	$92,400 (2,310 DLH)	$92,400 / $616,000 = 15.00%

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Account	Unadjusted Balance (AUD)	Applied Overhead Embedded (AUD)	Share of Applied Overhead
Cost of Goods Sold (Jobs 401–408, 410–411)	$1,478,400	$492,800 (12,320 DLH)	$492,800 / $616,000 = 80.00%
Total	**$1,848,000**	**$616,000 (15,400 DLH)**	**100.00%**

Step 1: Compute Applied Overhead and Variance

- MOH_{applied} = $40.00 × 15,400 DLH = $616,000.
- Overhead Variance = $652,000 – $616,000 = $36,000 under-applied.

Step 2: Direct Write-Off Method

If treated as immaterial, Debit COGS $36,000 and Credit Manufacturing Overhead Control $36,000. Adjusted COGS becomes $1,478,400 + $36,000 = $1,514,400; WIP and Finished Goods remain unchanged.

Step 3: Proration Method (Based on Applied Overhead Embedded)

- Allocation to WIP: 5.00% × $36,000 = $1,800 → Adjusted WIP = $92,400 + $1,800 = $94,200.
- Allocation to Finished Goods: 15.00% × $36,000 = $5,400 → Adjusted FG = $277,200 + $5,400 = $282,600.
- Allocation to COGS: 80.00% × $36,000 = $28,800 → Adjusted COGS = $1,478,400 + $28,800 = $1,507,200.

Proration based on embedded applied overhead yields the exact cost balances that would have been reported had the true actual overhead rate ($652,000 / 15,400 = $42.3377 per DLH) been known at year-end, ensuring full compliance with AASB 102 inventory valuation.

Chapter 3: Support Department Cost Allocation

3.1 Rationale for Allocating Support Department Costs

Large manufacturing facilities and service organisations separate their internal cost centres into **operating (producing) departments**—which directly add value to products or client services—and **support (service) departments**, such as Plant Maintenance, Information Technology, Facilities Management, and Human Resources, which sustain both operating departments and other support departments. To determine full product costs for AASB 102 valuation and departmental overhead rates, all support department costs must be systematically allocated into operating departments.

3.2 Three Allocation Methodologies

When support departments provide services not only to operating departments but also to each other (reciprocal services), management chooses among three allocation methods:

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1. **Direct Method:** Ignores all inter-support-department services completely, allocating each support department's cost directly to operating departments based solely on their relative shares of the cost driver.
2. **Step-Down (Sequential) Method:** Recognises inter-support services in one direction only. Support departments are ranked—typically starting with the department that renders the highest percentage (or dollar value) of service to other support departments. Once a support department's costs are allocated downward to remaining support and operating departments, it receives no allocations back from subsequent departments.
3. **Reciprocal Method:** Fully incorporates all mutual services rendered among support departments using simultaneous linear equations. For two support departments S_1 and S_2, total reciprocated costs (S_1^* and S_2^*) solve:

$$S_1^* = C_1 + p_{21}S_2^* \qquad \text{and} \qquad S_2^* = C_2 + p_{12}S_1^*$$

Where:

- S_1^*, S_2^*: Total reciprocated costs of Support Departments 1 and 2 (own direct cost plus cost allocated from the partner support department).
- C_1, C_2: Direct departmental costs incurred within Support Departments 1 and 2 prior to allocation.
- p_{21}: Proportion of Support Department 2's total service output consumed by Support Department 1.
- p_{12}: Proportion of Support Department 1's total service output consumed by Support Department 2.

3.3 Worked Example 2.3: Direct, Step-Down and Reciprocal Methods

Murray Valley Packaging Ltd operates two support departments—Maintenance (S_1, direct cost C_1 = \$180,000) and IT Systems (S_2, direct cost C_2 = \$120,000)—and two producing departments—Printing (P_1) and Laminating (P_2). Annual service consumption patterns are shown below:

Provider Department	Direct Cost	Used by S_1 (Maint.)	Used by S_2 (IT)	Used by P_1 (Printing)	Used by P_2 (Laminating)
S_1: Maintenance (Maint. Hours)	\$180,000	—	20%	50%	30%
S_2: IT Systems (Tickets)	\$120,000	10%	—	45%	45%

Method 1: Direct Method (Ignore $S_1 \leftrightarrow S_2$)

- **Maintenance (\$180,000):** Re-weight operating shares (50% + 30% = 80% total). Printing receives (50 / 80) × \$180,000 = \$112,500; Laminating receives (30 / 80) × \$180,000 = \$67,500.
- **IT Systems (\$120,000):** Re-weight operating shares (45% + 45% = 90% total). Printing receives (45 / 90) × \$120,000 = \$60,000; Laminating receives (45 / 90) × \$120,000 = \$60,000.
- **Totals Allocated:** Printing = \$172,500; Laminating = \$127,500 (Sum = \$300,000).

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Method 2: Step-Down Method (Rank S_1 first, as 20% to S_2 exceeds 10% to S_1)

- **Step 1 — Allocate Maintenance ($180,000) to S_2, P_1, P_2:** S_2 receives 20% × $180,000 = $36,000; P_1 receives 50% × $180,000 = $90,000; P_2 receives 30% × $180,000 = $54,000.
- **Step 2 — Allocate IT Systems ($120,000 + $36,000 = $156,000) to P_1, P_2 only:** Re-weight P_1 and P_2 shares (45 / 90 = 50% each). Printing receives 50% × $156,000 = $78,000; Laminating receives 50% × $156,000 = $78,000.
- **Totals Allocated:** Printing = $90,000 + $78,000 = $168,000; Laminating = $54,000 + $78,000 = $132,000 (Sum = $300,000).

Method 3: Reciprocal Method (Simultaneous Equations)

Set up the simultaneous equations using $p_{21} = 0.10$ and $p_{12} = 0.20$:

> $$S_1^* = 180{,}000 + 0.10S_2^* \qquad \text{and} \qquad S_2^* = 120{,}000 + 0.20S_1^*$$

Substitute S_2^* into S_1^*:

- $S_1^* = 180{,}000 + 0.10(120{,}000 + 0.20S_1^*) = 192{,}000 + 0.02S_1^*$
- Rearranging gives $S_1^* = \frac{192{,}000}{0.98}$ = $195,918.37.
- S_2^* = $120,000 + (0.20 × $195,918.37) = $159,183.67.

Allocate the reciprocated pools across all users (note that 20% of S_1^* goes back to S_2, and 10% of S_2^* goes back to S_1, leaving 80% of S_1^* and 90% of S_2^* in producing departments):

- **Printing (P_1):** (0.50 × $195,918.37) + (0.45 × $159,183.67) = $97,959.18 + $71,632.65 = $169,591.84 ≈ $169,592.
- **Laminating (P_2):** (0.30 × $195,918.37) + (0.45 × $159,183.67) = $58,775.51 + $71,632.65 = $130,408.16 ≈ $130,408.
- **Check Sum:** $169,592 + $130,408 = $300,000.

The reciprocal method provides the theoretically exact economic cost of operating each support department, preventing managers from underestimating internal IT or maintenance consumption.

Chapter 4: Process Costing Systems — Weighted Average and FIFO Methods

4.1 Continuous Production and Equivalent Units of Production (EUP)

In continuous industries—such as chemical refining, flour milling, brick kilns, or dairy pasteurisation—units flow incessantly through sequential processing departments. At month-end, each department typically holds partially completed units in ending Work in Process (WIP) alongside units carried in from beginning WIP. Because a unit that is 40% complete has not absorbed the same resources as a fully finished unit, dividing total departmental dollars by raw physical unit counts would distort unit cost.

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Process costing solves this by converting partially completed physical units into **Equivalent Units of Production (EUP)**—the number of whole, completed units that could have been produced given the amount of materials and conversion effort actually expended.

Equivalent units must be computed separately for each cost category whose timing of addition differs:

- **Direct Materials (DM):** Often added discretely at the beginning of a process (meaning any unit started is 100% complete as to DM), at specific inspection milestones, or at the end of processing.
- **Conversion Costs ($CC = DL + MOH$):** Typically incurred continuously and uniformly throughout the manufacturing cycle, so completion percentage reflects elapsed processing time.
- **Transferred-In Costs (TI):** In second or subsequent departments, units received from the preceding department arrive 100% complete with respect to prior-department costs.

4.2 The Five-Step Process Costing Framework

Regardless of whether an enterprise adopts the **Weighted Average Method** or the **First-In, First-Out (FIFO) Method**, departmental Production Cost Reports follow a standard five-step sequence:

1. Summarise the physical flow of units (verifying $\text{Beginning WIP} + \text{Started} = \text{Completed and Transferred Out} + \text{Ending WIP}$).
2. Compute Equivalent Units of Production (EUP) for each cost category.
3. Summarise total costs to account for (Beginning WIP cost + Current Period costs added).
4. Compute Cost per Equivalent Unit for each cost category.
5. Assign total costs to Units Completed and Transferred Out and to Ending WIP Inventory, reconciling total costs accounted for.

Weighted Average Versus FIFO Equations

The **Weighted Average Method** blends beginning WIP work and costs from the prior period together with current-period work and costs, computing a single pooled average cost per equivalent unit:

$$EUP_{\text{WA}} = U_{\text{completed}} + (U_{\text{EWIP}} \times \%_{\text{EWIP}})$$

$$c_{\text{WA}} = \frac{\text{Cost}_{\text{BWIP}} + \text{Cost}_{\text{current}}}{EUP_{\text{WA}}}$$

Where:

- EUP_{WA}: Weighted-average equivalent units of production for a given cost category.
- $U_{\text{completed}}$: Total physical units completed and transferred out during the period (includes both beginning WIP units finished and units started & completed this period).
- U_{EWIP}: Physical units in ending Work in Process inventory; $\%_{\text{EWIP}}$ is their percentage of completion for that cost category.

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- c_{WA}: Weighted-average cost per equivalent unit.
- $\text{Cost}_{\text{BWIP}}$ and $\text{Cost}_{\text{current}}$: Beginning WIP cost carried over and current-period cost added for that category.

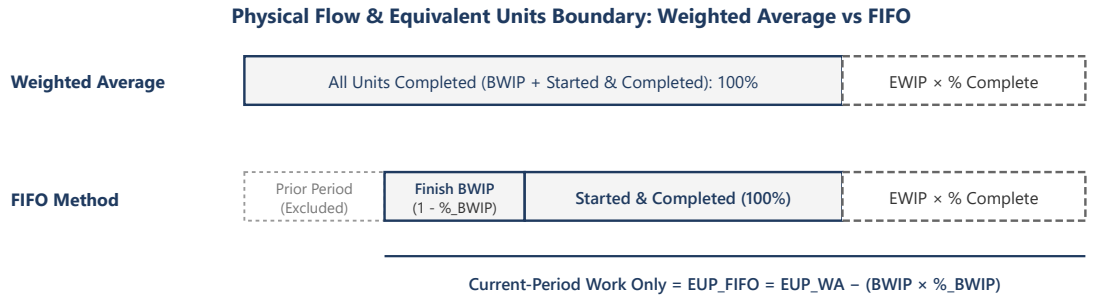
The **FIFO Method** strictly separates prior-period work from current-period work. Under FIFO, beginning WIP units are completed first, so EUP_{FIFO} measures *only the work performed during the current period*:

$$EUP_{\text{FIFO}} = [U_{\text{BWIP}} \times (1 - \%_{\text{BWIP}})] + U_{\text{S\&C}} + (U_{\text{EWIP}} \times \%_{\text{EWIP}})$$

$$c_{\text{FIFO}} = \frac{\text{Cost}_{\text{current}}}{EUP_{\text{FIFO}}}$$

Where:

- EUP_{FIFO}: FIFO equivalent units representing strictly current-period manufacturing effort.
- U_{BWIP}: Physical units in beginning WIP; $(1 - \%_{\text{BWIP}})$ is the remaining work required this period to finish them.
- $U_{\text{S\&C}}$: Units both started and completed entirely within the current period ($U_{\text{completed}} - U_{\text{BWIP}}$).
- c_{FIFO}: Current-period cost per equivalent unit, excluding beginning WIP dollar balances from the numerator.



4.3 Worked Example 2.4: Full Process Costing Schedules (Weighted Average vs FIFO)

Gippsland Dairy Concentrates Pty Ltd processes milk protein concentrate in its Blending & Pasteurisation Department. Direct materials are added 100% at the start of blending; conversion costs are incurred uniformly throughout the process. Data for August (in kilograms and AUD) are provided below:

- **Beginning WIP (1 August):** 4,000 kg (100% complete for DM; 30% complete for Conversion). Accumulated costs: DM $22,000; Conversion $8,200 (Total BWIP = $30,200).
- **Started during August:** 26,000 kg.

- **Completed & Transferred Out:** 25,000 kg.
- **Ending WIP (31 August):** 5,000 kg (100% complete for DM; 60% complete for Conversion).
- **Costs Added during August:** DM $158,000; Conversion $163,600 (Total Added = $321,600).
- **Total Costs to Account For:** $30,200 + $321,600 = $351,800.

Step 1: Physical Flow Verification (Identical for Both Methods)

Total units to account for = 4,000 + 26,000 = 30,000 kg. Total units accounted for = 25,000 + 5,000 = 30,000 kg. Note that within the 25,000 kg completed, $U_{\text{BWIP}} = 4{,}000\ \text{kg}$ came from beginning inventory and $U_{\text{S\&C}} = 25{,}000 - 4{,}000 = 21{,}000\ \text{kg}$ were both started and completed in August.

Part A: Weighted Average Production Cost Report

Step / Calculation	Physical kg	DM Equivalent Units	Conversion Equivalent Units	Total / Notes
Completed & Transferred Out (100%)	25,000	25,000	25,000	All completed kg at 100%
Ending WIP (DM 100%; CC 60%)	5,000	5,000	3,000	5,000 × 0.60 = 3,000
Total Equivalent Units (EUP_{WA})	**30,000**	**30,000**	**28,000**	—
Beginning WIP Cost	—	$22,000	$8,200	$30,200
Current-Period Cost Added (August)	—	$158,000	$163,600	$321,600
Total Pooled Cost	—	**$180,000**	**$171,800**	**$351,800**
Cost per Equivalent Unit (c_{WA})	—	**$6.0000**	**$6.1357**	**$12.1357 per kg**

Cost Assignment & Reconciliation (Weighted Average):

- **Transferred Out (25,000 kg):** 25,000 × ($6.0000 + $6.135714) = $303,392.86 (exact: $150,000.00 + $153,392.86).
- **Ending WIP (5,000 kg):** (5,000 × $6.0000) + (3,000 × $6.135714) = $30,000.00 + $18,407.14 = $48,407.14.
- **Total Cost Accounted For:** $303,392.86 + $48,407.14 = $351,800.00 (reconciled exactly).

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Part B: FIFO Production Cost Report

Step / Calculation	Physical kg	DM Equivalent Units	Conversion Equivalent Units	Total / Notes
Finish Beginning WIP (DM 0% left; CC 70% left)	4,000	0	2,800	4,000 × (1 − 0.30) = 2,800
Started & Completed in August (100%)	21,000	21,000	21,000	25,000 − 4,000 = 21,000
Ending WIP (DM 100%; CC 60%)	5,000	5,000	3,000	5,000 × 0.60 = 3,000
Total Equivalent Units (EUP_{FIFO})	**30,000**	**26,000**	**26,800**	Note: 28,000 − 1,200 = 26,800
Current-Period Cost Added Only	—	**$158,000**	**$163,600**	**$321,600**
Cost per Equivalent Unit (c_{FIFO})	—	**$6.0769**	**$6.1045**	**$12.1814 per kg**

Cost Assignment & Reconciliation (FIFO):

- **From Beginning WIP (4,000 kg):**
  - Prior-period carried cost: $30,200.00.
  - Cost to complete in August (Conversion only): 2,800 × $6.104478 = $17,092.54.
  - Total cost of 4,000 kg from BWIP = $47,292.54.
- **From Started & Completed (21,000 kg):** 21,000 × ($6.076923 + $6.104478) = 21,000 × $12.181401 = $255,809.42.
- **Total Completed & Transferred Out (25,000 kg):** $47,292.54 + $255,809.42 = $303,101.96.
- **Ending WIP (5,000 kg):** (5,000 × $6.076923) + (3,000 × $6.104478) = $30,384.62 + $18,313.43 = $48,698.05.
- **Total Cost Accounted For:** $303,101.96 + $48,698.04 = $351,800.00 (within $0.01 rounding).

Comparing the two methods reveals why FIFO is preferred for operational performance control: FIFO isolates August's true current conversion efficiency ($6.1045 per kg) without contaminating it with July's higher carried-over conversion cost ($8,200 / 1,200 = $6.8333 per kg). Conversely, Weighted Average is computationally simpler and yields virtually identical inventory valuations whenever input prices and beginning/ending WIP volumes remain stable across months.

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