Problem 3-23

1. Molding Department predetermined overhead rate:

\[
\text{Predetermined overhead rate} = \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}}
\]

\[
= \frac{\$602,000}{70,000 \text{ MHs}} = \$8.60 \text{ per machine-hour.}
\]

Painting Department predetermined overhead rate:

\[
\text{Predetermined overhead rate} = \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}}
\]

\[
= \frac{\$735,000}{\$420,000 \text{ direct labour cost}} = 175\% \text{ of direct labour cost.}
\]

2. Molding Department overhead applied:

\[
110 \text{ machine-hours} \times \$8.60 \text{ per machine-hour} = \$946
\]

Painting Department overhead applied:

\[
\$680 \text{ direct labour cost} \times 175\% = \$1,190
\]

Total overhead cost = \$2,136

3. Total cost of Job 205:

<table>
<thead>
<tr>
<th></th>
<th>Molding Dept.</th>
<th>Painting Dept.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct materials</td>
<td>$ 470</td>
<td>$ 332</td>
<td>$ 802</td>
</tr>
<tr>
<td>Direct labour</td>
<td>290</td>
<td>680</td>
<td>970</td>
</tr>
<tr>
<td>Manufacturing overhead applied</td>
<td>946</td>
<td>1,190</td>
<td>2,136</td>
</tr>
<tr>
<td>Total cost</td>
<td>$1,706</td>
<td>$2,202</td>
<td>$3,908</td>
</tr>
</tbody>
</table>

Unit product cost for Job 205:

\[
\frac{\$3,908}{50 \text{ units}} = \$78.16 \text{ per unit}
\]
### Problem 3-23 (continued)

---|---|---|
Manufacturing overhead incurred | $570,000 | $750,000 |
Manufacturing overhead applied: | | |
\[65,000 \text{ MHs} \times $8.60 \text{ per MH}\] | 559,000 | |
\[436,000 \text{ direct labour cost} \times 175\%\] | | 763,000 |
Underapplied (or overapplied) overhead | $11,000 | $(13,000) |
Problem 3-29

1. Research & Documents predetermined overhead rate:

\[
\text{Predetermined overhead rate} = \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}}
\]

\[
= \frac{\$840,000}{24,000 \text{ hours}} = \$35 \text{ per hour.}
\]

Litigation predetermined overhead rate:

\[
\text{Predetermined overhead rate} = \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}}
\]

\[
= \frac{\$360,000}{\$900,000 \text{ direct attorney cost}} = 40\% \text{ of direct attorney cost.}
\]

2. Research & Documents overhead applied:

26 hours x $35 per hour ..................................... $  910

Litigation overhead applied: $5,700 x 40% .............  2,280

Total overhead cost .............................................. $3,190

3. Total cost of Case 418-3:

<table>
<thead>
<tr>
<th>Departments</th>
<th>Research &amp; Documents</th>
<th>Litigation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legal forms and supplies</td>
<td>$  80</td>
<td>$   40</td>
<td>$ 120</td>
</tr>
<tr>
<td>Direct attorney cost</td>
<td>350</td>
<td>5,700</td>
<td>6,050</td>
</tr>
<tr>
<td>Overhead cost applied</td>
<td>910</td>
<td>2,280</td>
<td>3,190</td>
</tr>
<tr>
<td>Total cost</td>
<td>$1,340</td>
<td>$8,020</td>
<td>$9,360</td>
</tr>
</tbody>
</table>

4. Departmental overhead cost incurred ........ $870,000 $315,000

Departmental overhead cost applied:

26,000 hours x $35 per hour .................  910,000

$750,000 x 40% ............................................  300,000

Underapplied (or overapplied) overhead ... $ (40,000) $  15,000
Problem 3-30

1. a. Predetermined overhead rate = \( \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}} \)

\[ = \frac{840,000}{600,000 \text{ direct labour cost}} = 140\% \text{ of direct labour cost} \]

b. $9,500 \times 140\% = $13,300.

2. a. | Fabricating Department | Machining Department | Assembly Department |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated manufacturing overhead cost (a)</td>
<td>$350,000</td>
<td>$400,000</td>
</tr>
<tr>
<td>Estimated direct labour cost (b)</td>
<td>$200,000</td>
<td>$100,000</td>
</tr>
<tr>
<td>Predetermined overhead rate (a) ( \div ) (b)</td>
<td>175%</td>
<td>400%</td>
</tr>
</tbody>
</table>

b. Fabricating Department:
   $2,800 \times 175\% \quad \text{..........} \quad $4,900

Machining Department:
   $500 \times 400\% \quad \text{..........} \quad 2,000

Assembly Department:
   $6,200 \times 30\% \quad \text{..........} \quad 1,860

Total applied overhead \text{..........} \quad $8,760

3. The bulk of the labour cost on the Koopers job is in the Assembly Department, which incurs very little overhead cost. The department has an overhead rate of only 30\% of direct labour cost as compared to much higher rates in the other two departments. Therefore, as shown above, use of departmental overhead rates results in a relatively small amount of overhead cost being charged to the job.

Use of a plantwide overhead rate in effect redistributes overhead costs proportionately between the three departments (at 140\% of direct labour cost) and results in a large amount of overhead cost being charged to the Koopers job, as shown in Part 1. This may explain why the company
Problem 3-30 (continued)

bid too high and lost the job. Too much overhead cost was assigned to
the job for the kind of work being done on the job in the plant.

On jobs that require a large amount of labour in the Fabricating or
Machining Departments the opposite will be true, and the company will
tend to charge too little overhead cost to the jobs if a plantwide
overhead rate is being used. The reason is that the plantwide overhead
rate (140%) is much lower than the rates would be if these
departments were considered separately.

4. The company’s bid price was:

| Direct materials | $4,600 |
| Direct labour    | 9,500  |
| Manufacturing overhead applied (above) | 13,300 |
| Total manufacturing cost | $27,400 |
| Bidding rate x 1.5 | $41,100 |

If departmental overhead rates had been used, the bid price would have been:

| Direct materials | $4,600 |
| Direct labour    | 9,500  |
| Manufacturing overhead applied (above) | 8,760  |
| Total manufacturing cost | $22,860 |
| Bidding rate x 1.5 | $34,290 |

Note that if departmental overhead rates had been used, Teledex
Company would have been the low bidder on the Koopers job since the
competitor underbid Teledex by only $2,000.

5. a. Actual overhead cost $864,000
   Applied overhead cost ($580,000 x 140%) 812,000
   Underapplied overhead cost $ 52,000
**Problem 3-30** (continued)

b. 

<table>
<thead>
<tr>
<th>Department</th>
<th>Fabricating</th>
<th>Machining</th>
<th>Assembly</th>
<th>Total Plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual overhead</td>
<td>$360,000</td>
<td>$420,000</td>
<td>$84,000</td>
<td>$864,000</td>
</tr>
<tr>
<td>cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applied overhead</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cost</td>
<td>$210,000 x 175%</td>
<td>367,500</td>
<td>432,000</td>
<td>78,600</td>
</tr>
<tr>
<td></td>
<td>$108,000 x 400%</td>
<td>432,000</td>
<td></td>
<td>878,100</td>
</tr>
<tr>
<td></td>
<td>$262,000 x 30%</td>
<td>78,600</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underapplied</td>
<td>$ (7,500)</td>
<td>$(12,000)</td>
<td>$ 5,400</td>
<td>$(14,100)</td>
</tr>
<tr>
<td>overhead cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
