

Wood Manufacturing & Finishing Percentage Waste

Phase 6

Lecturer Jennifer Byrne

Percentages

- **Percent means per 1 hundred**
- **The symbol used is %**
- To find the percentage we put the number over 100
- $50\% = \frac{50}{100} \quad \frac{5}{10} \quad \frac{1}{2} \quad \text{or} \quad 0.5$
- $200 + 50\% = 200 \div 100 = 2$
- $2 \times 50 = 100 \quad 200 + 100 = 300$
- on your calculator type in
- $200 + 50\% = 300$ or $200 \times 0.5 = 100$
- $200 + 100 = 300$

Percentage Waste

- **Eg.** Calculate the percentage waste when 21 circular stool seats, 325mm in diameter, are cut from a sheet of MDF measuring 1.220m x 2.440m. Formula for the area of a circle = πr^2
Formula for percentage waste = $\frac{\text{Waste} \times 100}{\text{Material}}$
- **Area of MDF sheet** = $1.220 \times 2.440 = 2.9768\text{m}^2$
- **Area of stool seat** = $3.14 \times 0.1625 \times 0.1625 = 0.0829\text{m}^2$
- **Area of 21 stool seats** = $0.0829 \times 21 = 1.7409\text{m}^2$
- Sheet Area - 21 stool seats = Waste
- $2.9768 - 1.7409 = 1.2359\text{m}^2$
- **Waste ÷ Sheet Area = Percentage waste**
- $1.2359 \div 2.9768 = 0.415$, $0.415 \times 100 = 41.5\%$
- **Percentage waste = 41.5%**

Percentage Waste

- **Q1.** Calculate the percentage waste when the material for 2 Lockers are cut from a sheet of MDF measuring 1.220m x 2.00m. Each Locker uses 0.922m²
- Area of MDF sheet = 1.220 x 2.00 = 2.44m²
- Area of 1 locker = 0.922m²
- Area of 2 lockers = 0.922 x 2 = 1.844m²
- Sheet Area – 2 lockers = Waste
- 2.44 - 1.844 = 0.596m²
- Waste ÷ Sheet Area = Percentage waste
- 0.596 ÷ 2.44 = 0.244 (x 100)
- Percentage waste = 24%

Percentage Waste

- **Q2.** Calculate the percentage waste when 8 Squares, 400mm in width are cut from a sheet of MDF measuring 1.220m x 2.00m.
- **Area of MDF sheet** = $1.220 \times 2.00 = 2.44\text{m}^2$
- **Area of 1 square** = $0.40 \times 0.40 = 0.16\text{m}^2$
- **Area of 8 squares** = $0.16 \times 8 = 1.28\text{m}^2$
- **Sheet Area – 8 Squares = Waste**
- $2.44 - 1.28 = 1.16\text{m}^2$
- **Waste ÷ Sheet Area = Percentage waste**
- $1.16 \div 2.44 = 0.475 \quad (\times 100)$
- **Percentage waste** = 47.5%

Percentage Waste

- **Q3.** Calculate the percentage waste when 7 Tops, 400mm x 300mm are cut from a sheet of MDF measuring 1.220m x 950mm.
- **Area of MDF sheet** = $1.220 \times 0.950 = 1.159\text{m}^2$
- **Area of 1 top** = $0.40 \times 0.30 = 0.12\text{m}^2$
- **Area of 7 tops** = $0.12 \times 7 = 0.84\text{m}^2$
- **Sheet Area – 7 Tops = Waste**
- $1.159 - 0.84 = 0.319\text{m}^2$
- **Waste ÷ Sheet Area = Percentage waste**
- $0.319 \div 1.159 = 0.275 \text{ (x 100)}$
- **Percentage waste** = 27.5%

Percentage Waste

- **Q4.** Calculate the percentage waste when 12 Tops, 330mm x 350mm are cut from a sheet of MDF measuring 1.220m x 1.450m.
- **Area of MDF sheet** = $1.220 \times 1.450 = 1.769\text{m}^2$
- **Area of 1 top** = $0.330 \times 0.350 = 0.1155\text{m}^2$
- **Area of 12 tops** = $0.1155 \times 12 = 1.386\text{m}^2$
- **Sheet Area – 12 Tops = Waste**
- $1.769 - 1.386 = 0.383\text{m}^2$
- **Waste ÷ Sheet Area = Percentage waste**
- $0.383 \div 1.769 = 0.2165$ (x 100)
- **Percentage waste** = 21.65%

Percentage Waste

- **Q5.** Calculate the percentage waste when 16 Triangles, 400mm in width x 600mm in height are cut from a sheet of MDF measuring 1.220m x 2.100m.
- **Area of MDF sheet** = $1.220 \times 2.10 = 2.562\text{m}^2$
- **Area of 1 Triangle** = $0.20 \times 0.60 = 0.12\text{m}^2$
- **Area of 16 Triangles** = $0.12 \times 16 = 01.92\text{m}^2$
- **Sheet Area – 16 Triangles = Waste**
- $2.562 - 1.92 = 0.642\text{m}^2$
- **Waste ÷ Sheet Area = Percentage waste**
- $0.642 \div 2.562 = 0.250 \text{ (x 100)}$
- **Percentage waste = 25%**

Percentage Waste

- **Q6.** Calculate the percentage waste when 7 Triangles, 450mm in width x 500mm in height are cut from a sheet of MDF measuring 1.220m x 2.100m.
- **Area of MDF sheet** = $1.220 \times 2.10 = 2.562\text{m}^2$
- **Area of Triangle** = $0.225 \times 0.50 = 0.1125\text{m}^2$
- **Area of 7 Triangles** = $0.1125 \times 7 = 0.7875\text{m}^2$
- **Sheet Area – 7 Triangles = Waste**
- $2.562 - 0.7875 = 1.7745\text{m}^2$
- **Waste ÷ Sheet Area = Percentage waste**
- $1.7745 \div 2.562 = 0.692 \text{ (x 100)}$
- **Percentage waste** = 69.2%

Percentage Waste

- **Q7.** Calculate the percentage waste when 16 circular stool seats, 400mm in diameter, are cut from a sheet of MDF measuring 1.220m x 2.440m.
- **Area of MDF sheet** = $1.220 \times 2.440 = 2.976\text{m}^2$
- **Area of 1 stool seat** = $3.14 \times 0.20 \times 0.20 = 0.1256\text{m}^2$
- **Area of 16 stool seats** = $0.1256 \times 16 = 2.0096\text{m}^2$
- **Sheet Area - 16 stool seats = Waste**
- $2.976 - 2.0096 = 0.9664\text{m}^2$
- **Waste \div Sheet Area = Percentage waste**
- $0.9664 \div 2.976 = 0.324 \quad (\times 100)$
- **Percentage waste** = 32.4%

Percentage Waste

- **Q8.** Calculate the percentage waste when 8 half round table tops, 500mm in diameter, are cut from a sheet of pine measuring 1.220m x 2.440m.
- Area of MDF sheet = $1.220 \times 2.440 = 2.976\text{m}^2$
- Area of 1 half round top = $\frac{1}{2} (3.14 \times 0.25 \times 0.25) = 0.098\text{m}^2$
- Area of 8 half round tops = $0.098 \times 8 = 0.785\text{m}^2$
- Sheet Area - 8 half round tops = Waste
- $2.976 - 0.785 = 2.191\text{m}^2$
- Waste \div Sheet Area = Percentage waste
- $2.191 \div 2.976 = 0.7365$ (x 100)
- Percentage waste = 73.65%

Percentage Waste

- **Q9.** Calculate the percentage waste when 6 half round table tops, 850mm in diameter, are cut from a sheet of MDF measuring 1.220m x 2.440m.
- Area of MDF sheet = $1.220 \times 2.440 = 2.976\text{m}^2$
- Area of 1 half round top = $\frac{1}{2} (3.14 \times 0.425 \times 0.425) = 0.283\text{m}^2$
- Area of 8 half round tops = $0.283 \times 6 = 1.698\text{m}^2$
- Sheet Area - 8 half round tops = Waste
- $2.976 - 1.698 = 2.191\text{m}^2$
- Waste \div Sheet Area = Percentage waste
- $1.278 \div 2.976 = 0.429$ (x 100)
- Percentage waste = 42.94%