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## 1. Background

FRASER PTY LTD has been requested to quote on the **Survey and Repair of 6 Speaker Interface Boxes**.

The Speaker Interface Boxes are part of the audio/broadcast system of a commercial vessel and is designed to connect the microphone to a horn speaker. In the Speaker Interface Box, the volume level of horn speaker can be adjusted using 2 pots on the PCB.

A flow diagram of the Speaker Interface Box has been shown below:



Each item was removed from an in-service ship. The ship advises that each item is unserviceable with the following causes:

- No output
- Faulty components
- Missing components
- Severe corrosion

FRASER PTY LTD has composed the Task list, WBS, Pert Chart and Cost Analysis.

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## 2. Objectives

Although this is a rather small project, it is to be noted that there are 6 ships in this fleet. Each ship requires approximately 6 of these Speaker Interface Boxes per ship. This offers the opportunity to gain future maintenance work on this system. The following objectives have come about:

- Provide prompt and assured repair of the product so that the customer is willing to provide FRASER PTY LTD with more work
- Gain the customers trust so that recommendations can be made to their other business partners
- Offer any guidance or other innovative ideas on how this system can be improved (this helps with gaining future business prospects and also show our knowledge and experience)

## 3. Target Audience

The customer is our main target audience. It is important to provide a good work ethic with the customer to ensure future work opportunities arise.

## 4. Task List

The following tasks have been identified in order to complete this project.

1. Survey and Repair of 6 Speaker Interface Boxes
  - 1.1. Create JSEA
  - 1.2. Survey and Inspect 6 Speaker Interface Boxes
  - 1.3. Functionality Test on 6 Speaker Interface Boxes
    - 1.3.1. Book test room
    - 1.3.2. Retrieve access code for test room
    - 1.3.3. Run functionality test
    - 1.3.4. Fault find any issues during functionality test
  - 1.4. Opening report
  - 1.5. Assemble Material List
  - 1.6. Prepare estimate for repair materials
    - 1.6.1. Retrieve quotes and lead times from preferred vendors
    - 1.6.2. Check warehouse for available materials
  - 1.7. Drawing and configuration updates
  - 1.8. Gather items from material list
    - 1.8.1. Retrieve items from warehouse
    - 1.8.2. Order parts from vendors
    - 1.8.3. Manufacture of any additional parts
  - 1.9. Clean and renew of parts per unit (6 units)
  - 1.10. Replace faulty/corroded parts per unit (6 units)
  - 1.11. Testing of 6 units
  - 1.12. Preparation of 6 units for transit
  - 1.13. Generate conformance certificates and test records
  - 1.14. Closing report
  - 1.15. Complete work pack and issue to project office

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## 5. Work Breakdown Structure

The tasks outlined in the section above have been placed in a Work Breakdown Structure Worksheet

Work ID	Work Name	Labour Hours	Dependency	Owner
1.0	Survey and Repair of 6 Speaker Interface Boxes	79		Technician
1.1	Create JSEA	1		Technician
1.2	Survey and Inspect 6 Speaker Interface Boxes	6	1.1	Technician
1.3	Functionality Test on 6 Speaker Interface Boxes	11		Technician
1.3.1	Book test room	0.5	1.2	Trainee
1.3.2	Retrieve access code for test room	0.5	1.2	Technician
1.3.3	Run functionality test	6	1.3.1, 1.3.2	Technician
1.3.4	Fault find any issues during functionality test	4	1.3.3	Technician
1.4	Opening Report	2	1.3.4	Technician
1.5	Assemble Material List	4	1.4	Technician
1.6	Prepare estimate for repair materials	12		Technician
1.6.1	Retrieve quotes and lead times from preferred vendors	3.5	1.5	Technician
1.6.2	Check warehouse for available materials	2	1.5	Trainee
1.7	Drawing and configuration updates	6	1.6.4	Technician
1.8	Gather items from material list	43		Technician
1.8.1	Retrieve items from warehouse	2	1.6.2	Trainee
1.8.2	Order parts from vendors	2	1.6.1	Technician
1.8.3	Manufacture of any additional parts	4	1.5, 1.7	Technician
1.9	Clean and renew of parts per unit (6 units)	12	1.8.1, 1.8.2, 1.8.3	Technician, Trainee
1.10	Replace faulty/corroded parts per unit (6 units)	6	1.9	Technician, Trainee
1.11	Testing of 6 units	8	1.10	Technician
1.12	Preparation of 6 units for transit	2	1.11	Trainee
1.13	Generate conformance certificates and test records	3	1.11	Technician
1.14	Closing report	2	1.12, 1.13	Technician
1.15	Complete work pack and issue to project office	2	1.14	Technician

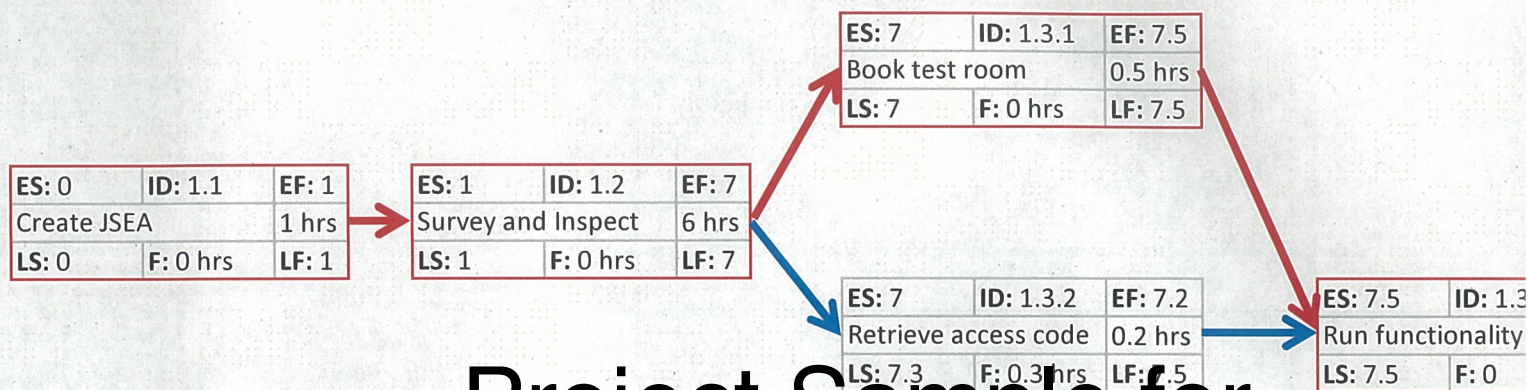
The total amount of labour hours required to complete this project is 79 hrs.



## 6. PERT Chart

The following PERT Chart has been created based on WBS. The red path illustrated the critical path.

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## LEGEND

ID = Task Identification

ES = Early Start

EF = Early Finish

LS = Late Start

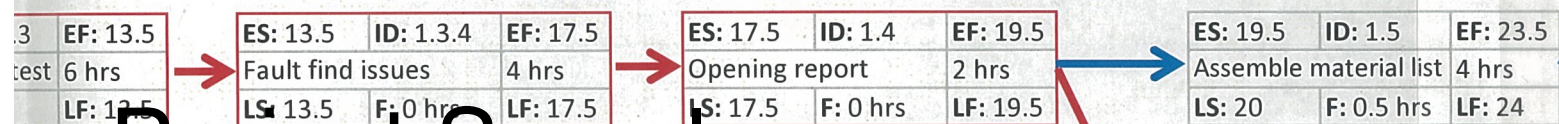
LF = Late Finish

F = Float

→ = Critical Path

→ = Non-Critical Task

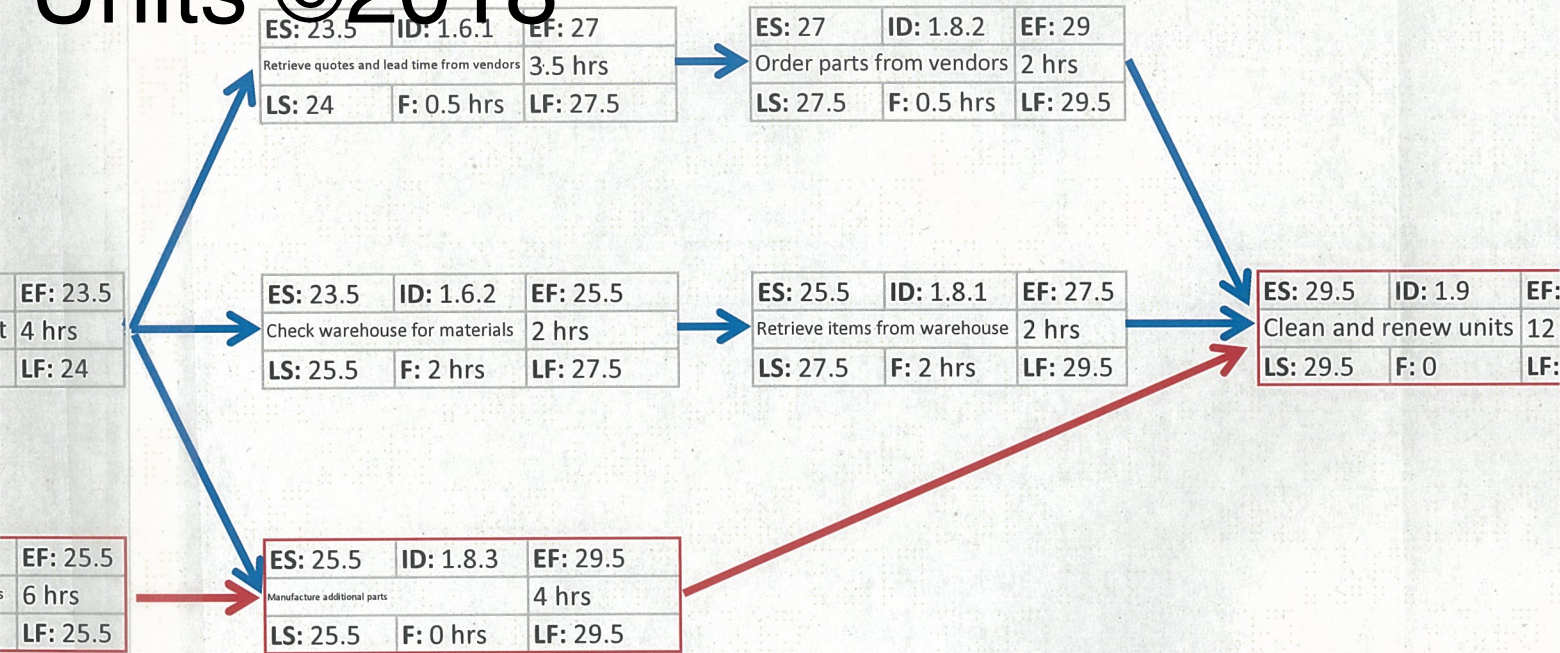




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ES: 1.9	EF: 41.5
new units	12 hrs
LS: 0	LF: 41.5

ES: 41.5	ID: 1.10	EF: 47.5
Replace faulty parts/components	6 hrs	
LS: 41.5	F: 0 hrs	LF: 47.5

ES: 47.5	ID: 1.11	EF: 55.5
Testing 6 units	8 hrs	
LS: 47.5	F: 0 hrs	LF: 55.5

ES: 55.5	ID: 1.12	EF: 56.5
Preparation for transit	2 hrs	
LS: 56.5	F: 1 hrs	LF: 57.5

ES: 55.5	ID: 1.13	EF: 58.5
Generate Conformance Certificates	3 hrs	
LS: 55.5	F: 0 hrs	LF: 58.5

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12	EF: 57.5
transit 2 hrs	
hrs	LF: 58.5

13	EF: 58.5
rtificates 3 hrs	
hrs	LF: 58.5

ES: 58.5	ID: 1.14	EF: 60.5
Closing report		2 hrs
LS: 58.5	F: 0 hrs	LF: 60.5

ES: 60.5	ID: 1.15	EF: 62.5
Complete work pack		2 hrs
LS: 60.5	F: 0 hrs	LF: 62.5

# Project Sample

## for Project Management

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## 7. Gantt Chart

The following Gantt Chart has been created based on the WBS. Slack has also been included.

It is to be noted that the duration listed in the WBS is 79 hours and the Gantt Chart shows 62.5 hours. The 79 hours is the amount of labour hours it will take to complete the job. There are 2 people who will work simultaneously on some tasks therefor showing as 62.5 hours on the Gantt Chart.

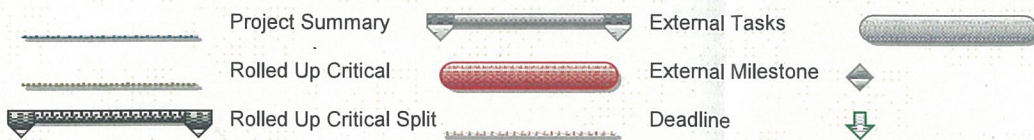
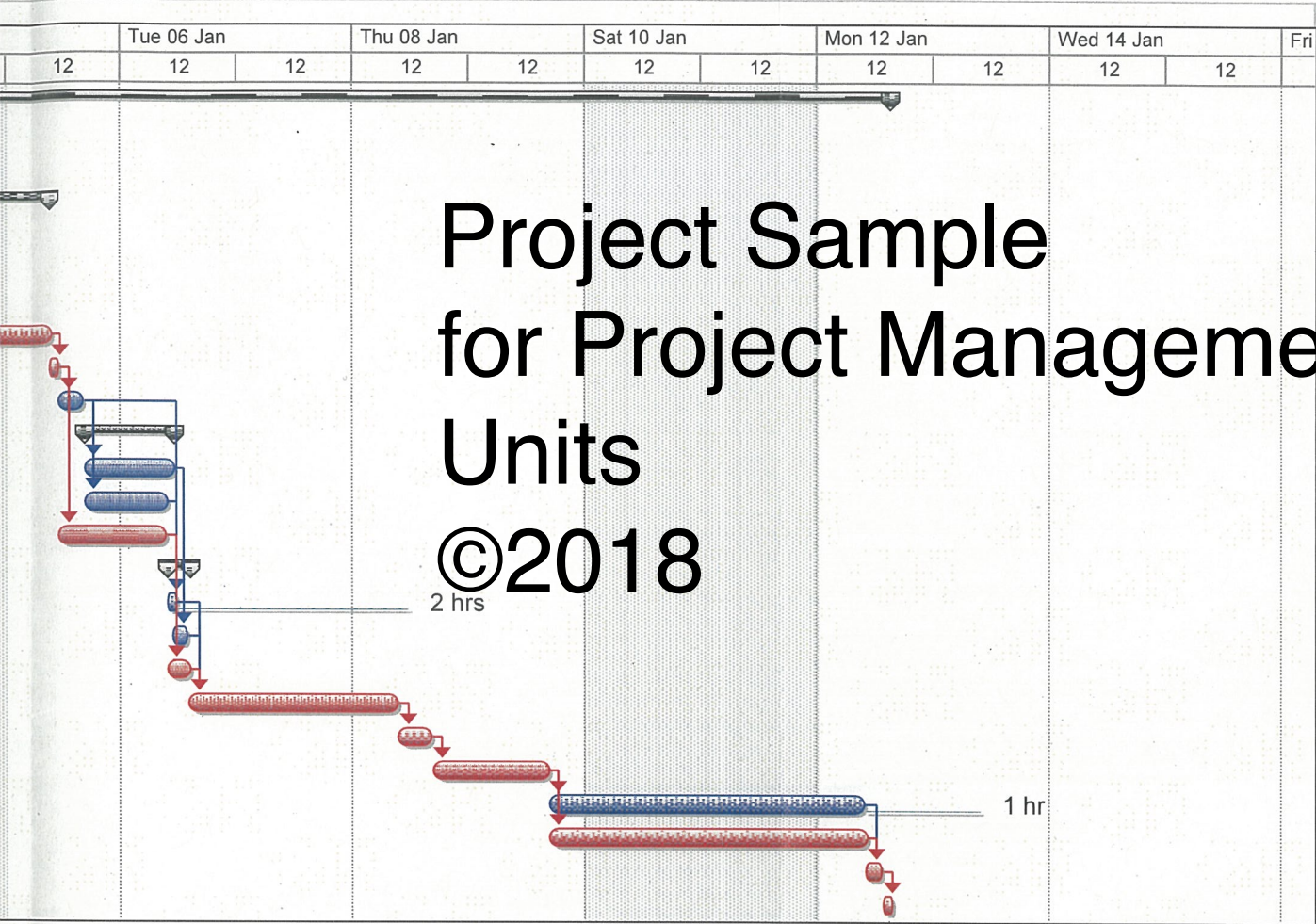


	Task Name	Duration	Start	Finish	Wed 31 Dec		Fri 02 Jan		Sun 04 Jan	
					12	12	12	12	12	
1	<b>Survey and Repair o</b>	<b>62.5 hrs</b>	<b>Thu 1/1/15</b>	<b>Mon 12/1/15</b>						
2	Create JSEA	1 hr	Thu 1/1/15	Thu 1/1/15						
3	Survey and Inspect	6 hrs	Thu 1/1/15	Thu 1/1/15						
4	<b>Functionality Test</b>	<b>10.5 hrs</b>	<b>Thu 1/1/15</b>	<b>Mon 5/1/15</b>						
5	Book test room	0.5 hrs	Thu 1/1/15	Thu 1/1/15						
6	Retrieve access	0.2 hrs	Thu 1/1/15	Thu 1/1/15						
7	Run functionality	6 hrs	Thu 1/1/15	Fri 2/1/15						
8	Fault find any iss	4 hrs	Fri 2/1/15	Mon 5/1/15						
9	Opening Report	2 hrs	Mon 5/1/15	Mon 5/1/15						
10	Assemble Material	4 hrs	Mon 5/1/15	Mon 5/1/15						
11	<b>Prepare estimate</b>	<b>3.5 hrs</b>	<b>Mon 5/1/15</b>	<b>Tue 6/1/15</b>						
12	Retrieve quotes	3.5 hrs	Mon 5/1/15	Tue 6/1/15						
13	Check warehouse	2 hrs	Mon 5/1/15	Tue 6/1/15						
14	Drawing and config	6 hrs	Mon 5/1/15	Tue 6/1/15						
15	<b>Gather items from</b>	<b>4 hrs</b>	<b>Tue 6/1/15</b>	<b>Tue 6/1/15</b>						
16	Retrieve items fr	2 hrs	Tue 6/1/15	Tue 6/1/15						
17	Order parts from	2 hrs	Tue 6/1/15	Tue 6/1/15						
18	Manufacture of a	4 hrs	Tue 6/1/15	Tue 6/1/15						
19	Clean and renew o	12 hrs	Tue 6/1/15	Thu 8/1/15						
20	Replace faulty/corr	6 hrs	Thu 8/1/15	Thu 8/1/15						
21	Testing of 6 units	8 hrs	Thu 8/1/15	Fri 9/1/15						
22	Preparation of 6 un	2 hrs	Fri 9/1/15	Mon 12/1/15						
23	Generate conforma	3 hrs	Fri 9/1/15	Mon 12/1/15						
24	Closing report	2 hrs	Mon 12/1/15	Mon 12/1/15						
25	Complete work pac	1 hrs	Mon 12/1/15	Mon 12/1/15						

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<b>Project: Speaker Interface Box Gantt Chart</b> <b>Date: Wed 11/6/14</b>	Critical		Split		Slack
	Critical Split		Progress		Slippage
	Task		Milestone		Summary





## 8. Cost Analysis

### 8.1 Labour Costs

The total amount of labour hours required to complete this project is 79 hrs. Two people will be assigned to the project. The following charges will be applied.

Title	Current Wage	Charge-out Rate
Technician	\$239.23 / hr	\$350.00 / hr
Trainee	\$154.84 / hr	\$200.00 / hr

As per the WBS:

- Technician will carry out 63.5 hrs of the project.
- Trainee will carry out 15.5 hrs of the project.

Please view section **6.3 Profit and Loss Forecast** for final cost analysis.



## 8.2 Material Cost Summary

Below is a list of all the items required to repair the 6 Speaker Interface Boxes. Please note the following:

- All prices are excluding GST
- Freight has not been included in any of these costs
- Prices may inflate as quotes have expiry dates.

Part No.	Part Description	QTY	Unit Price	Total Price	Vendor	Notes
001	EMI filter	7	\$23.35	\$163.45	RS Components	
002	Terminal Block	3	\$4.18	\$12.54	Element 14	
003	Diecast Box Modification	5	\$305.00	\$1,525.00	Nepean Engineering & Innovation	Quote based on 5 boxes. 4 week lead time.
004	Diodes	12	N/A	\$4.74	Element 14	Only sold in packs of 10.
005	Bootlace Ferrules	50	N/A	\$14.20	RS Components	Only sold in packs of 100
006	Switch boot	6	N/A	\$15.18	RS Components	Can only be ordered in multiples of 5
007	Switch	5	\$46.36	\$231.80	RS Components	
008	M8 Fibre Washer	4	\$9.15	\$36.60	RS Components	
009	M3 Spacer	30	N/A	\$19.50	RS Components	Only sold in packs of 50
010	M3 screw for spacer	30	N/A	\$4.84	Blackwoods	
011	M3 washer flat for spacer	30	N/A	\$7.70	RS Components	Only sold in packs of 100
012	M3 nut for spacer	30	N/A	\$37.10	RS Components	Only sold in packs of 100
013	M8 x 25 hex	4	N/A	\$0.60	Blackwoods	
014	M8 nut hex	8	N/A	\$0.47	Blackwoods	only sold in packs of 100.
015	M8 flat washer	12	N/A	\$0.34	Blackwoods	only sold in packs of 100.
016	M8 spring washer	8	N/A	\$0.11	Blackwoods	only sold in packs of 100.
017	Capacitor 2200uF	6	N/A	\$18.58	RS Components	Only sold in packs of 5 and in multiples of 5
018	Panel Cable Entry VGN 62	15	\$14.70	\$220.50	Thomas & Betts	
020	Washer spring M16 NPB	15	\$0.28	\$4.20	Blackwoods	
021	Cable 22AWG insulated white 19/0.16	minimum 22m	N/A	\$15.00	Cambridge Technologies	comes in 30m reels only
022	Wire 19 x 0.2 insulated red type 44 20AWG	minimum 3m	N/A	\$19.50	Cambridge Technologies	comes in 30m reels only
023	Wire 19 x 0.2 insulated black type 44 20AWG	minimum 3m	N/A	\$19.50	Cambridge Technologies	comes in 30m reels only
024	Screw lock assy	12	N/A	\$15.20	Element 14	
025	Screw and clip	12	\$2.36	\$28.32	Element 14	Not included in parts list however is required for item 88.
027	Label ID plate for new box	5	\$51.00	\$255.00	Permagraphics	

**\$2,979.63**

The total material cost required to repair the 6 Speaker Interface Boxes comes to **\$2,979.63**.

### 8.3 Profit and Loss Forecast



Looking at the chart above, this is quite a small project however it will contribute a NET profit of **\$9,734**.

Below you will find the breakdown of expenses. Material costs will be charged to the customer at

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PROFIT & LOSS FORECAST		2014
Technician Charge Rate \$750/hr x 63.5		\$22,225
Trainee Charge Rate \$200/hr x 11.5		\$2,400
Material Costs		\$2,980
Freight Costs		\$500
Project Administration		\$2,000
<b>Gross profit/net sales</b>		<b>\$30,805</b>
<b>Expenses</b>		
Material costs		\$2,980
Technician Wage \$239.23/hr x 63.5		\$15,191
Trainee Wage \$154.84/hr x 15.5		\$2,400
Freight Costs		\$500
<b>Total expenses</b>		<b>\$21,071</b>
<b>NET PROFIT</b>		<b>\$9,734</b>