TOTAL EXCELLENCE MANUFACTURING

TXM Lean Solutions Pty Ltd
ABN 447 885 800 54
211/134 Cambridge Street
Collingwood VIC 3066 Australia

P +61 3 9607 8241
F +61 3 9419 2572
info@txm.com.au
www.txm.com.au

HAULAGE VALUE STREAM MAPPING REPORT
Bunbury Geographe Timber Precinct

Anthony Clyne

11th December 2019

Table of Contents

EXECUTIVE SUMMARY

TXM was engaged by the South West Timber Hub Steering Committee to assist in mapping and analysing the end to end transport supply chain for hardwood and softwood forests in South West WA. The aim was to identify opportunities' to reduce transport costs and waste.

A two staged analysis was taken to complete this work:

1. TXM undertook preliminary site visits to undertake further process analysis
2. TXM worked with the forest products project team to map the end to end flow, analyse transport practices and data, and make recommendations.

Overall TXM and the Forest Products Project Team identified the opportunity to improve efficeincy, safety, environmental impacts and raise the profile of the industry as a modern and progressive provider of local employment. Truck movements may be reduced by approximately 4%. Given the $209m F19 budget this translates to a $ 8m benefit. Initiatives are:

- Optimise the allocation of work to each vehicle (reduces by 2% or $4m)
- Reduce waiting in the field reduces by 3% ($ 6m)
- Reduce waiting at the Port to deliver chip 1% ($2m)
- The proposed Timber Hub will increase distance travelled by 0.5% but save fleet resources with faster and more certain turnaround time (add $1m but needed for the nett benefit)

Five key recommendations have been identified by the consultant. These were

- *Recommendation One - The development of an Integrated Timber Processing Yard be investigated*

  The creation of an Integrated Timber Processing Yard (ITPY) that can be a centre for excellence for forest activities.

- *Recommendation Two - Analysis of central dispatch practices at both Colac and Mount Gambier be undertaken and to determine its appropriateness for a WA environment.*

  The implementation and effectiveness need to be understood before recommending to be installed.

- *Recommendation Three - Manage truck turnaround times consistently across the existing contractor base.*

  Create standard benchmark times for standard load & unload cycles and commonise management of these.

- *Recommendation Four - in the short term trial monthly and weekly wood flow meeting*

  The FPC the Contractors can communicate better in a structured forum. Variations to improve include yields, access, weather, customers, or other mitigating circumstance.

- *Recommendation Five - additional focus & resources available to continually improve OHS.*

  It is acknowledged that there has been significant work undertaken in the area of safety within the industry over recent years. There is an opportunity to take the industry beyond a safety compliance culture to a best practice in industrial safety culture

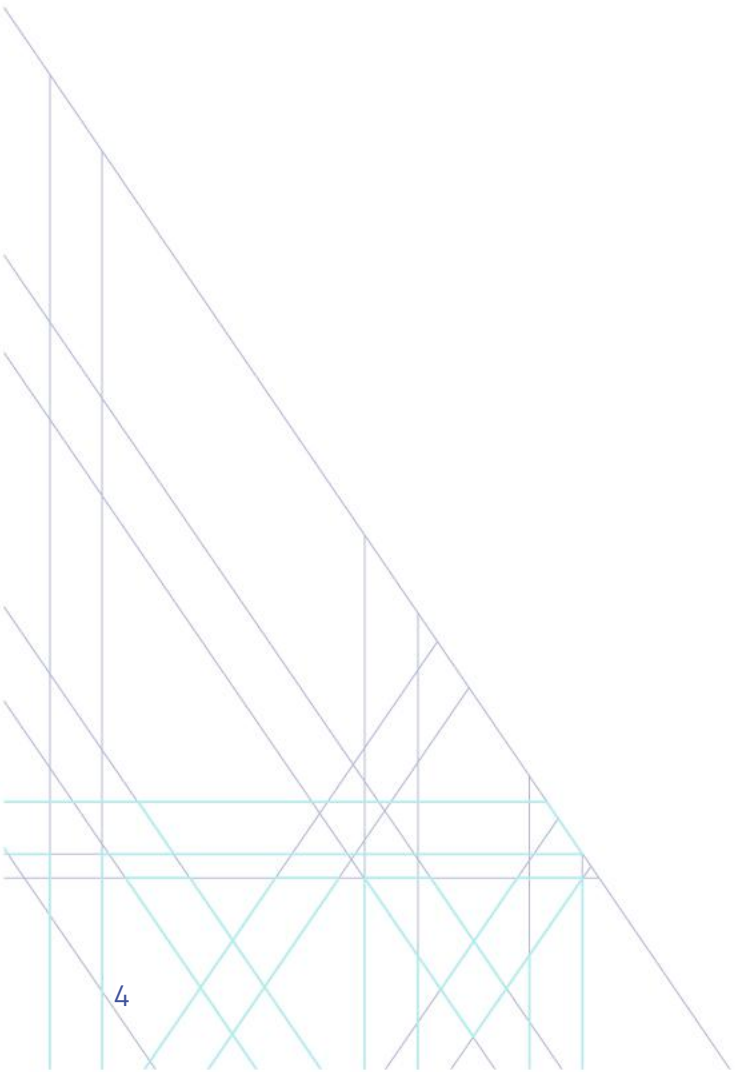
BACKGROUND

The Bunbury area features a vertically integrated supply chain for softwoods from growing and harvesting trees through production of wood chips, timber, particle board and laminated veneer lumber (LVL). The softwood supply chain is also closely connected to the hardwood and native timber forests that are in the same area, sharing infrastructure, transport and some elements of the supply chain.

The members of the Bunbury Timber Precinct face collective and individual challenges ensuring the maximum return for the forest resource, securing supply to the various end markets and ensuring cost competitiveness.

A value stream mapping project in 2017 has identified significant savings within the supply chain with a 10% reduction in cost per hectare expected by 2020, representing an annual saving of $14m per year based on an average harvest of 8000 Ha. This is expected to increase to a 20% saving by 2060 as trees planted now mature and are harvested.

Action plans from the 2017 project focused upstream on the nursery, preparation and establishment and maintenance of the softwood forest and improving harvesting yield. However around 80% of costs in the supply chain are involved in harvesting and haulage. This project is therefore intended to focus on ways to optimise haulage of logs and wood chips from both the softwood and native timber forests to customers.



STAGES OF ANALYSIS

The TXM value stream mapping process involved the following three stages listed below.

Following the initial process, the project team were not engaged in making objective identification of waste as previous TXM project teams.

The conclusions in the main body of this report have been created independently of the project team in conjunction with the Forest Products participants in a debrief workshop held in July 2019, and by TXM.

STAGE ONE - Site visits and process analysis.

TXM and Forest Products Commission staff undertook some preliminary data gathering and process analysis. A day was spent observing operations of Plantation Logging. One day spent with Dawson Contracting and one day observing operations at the Bunbury Port.

Video, photographs and time in motion studies were taken to be shared in the project team workshops.

Process Analysis

TXM conducted a structured process.

A high level end to end value stream map demonstrating the flow of materials found at the back of this report in (Appendix 1).

Key Observations – Softwood Haulage Planning

Method of observation:

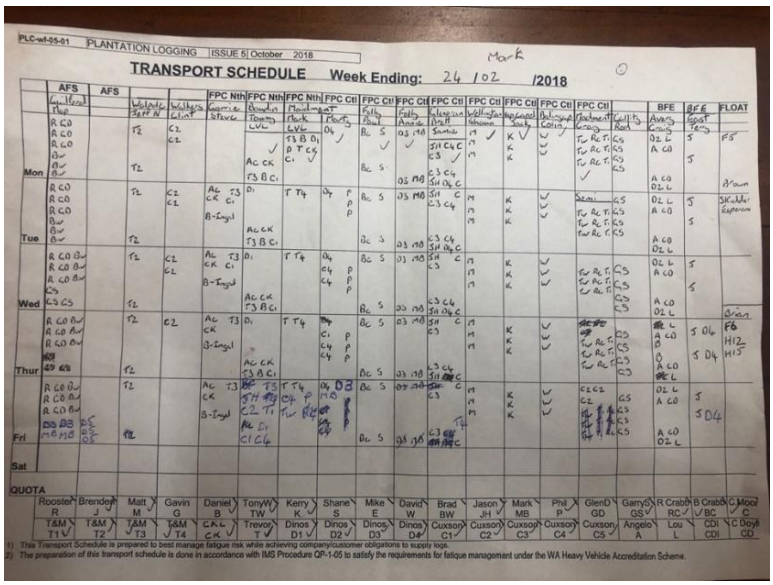
Interviewed the planner at Plantation Logging Co. and observed how the weekly and daily plans are created and adjusted.

What TXM saw:

A hand drawn sheet created with an overlay of the previous month. The process was to start with a blank plan and then use knowledge of each coupe and experience of each individual driver to allocate runs. First the harvesters where allocated and then the haulage runs were allocated. The haulage runs were allocated to manage fatigue, maximise driver utilisation, maximise overnight synergy with the driver's home location, and deliver the contractual requirement. The science involved relied knowledge of the route drive times and the capacity of the individual driver.

Analysis:

The plan uses the pattern of repetition to provide a predictable and standard work sequence for the people doing the work.



PLC-wf-05-01 PLANTATION LOGGING ISSUE 5| October 2018

TRANSPORT SCHEDULE Week Ending: 24/02/2018

	AFS	AFS			FPC Nth	FPC Nth	FPC Nth	FPC Ctl	FPC Ctl	FPC Ctl	FPC Ctl	FPC Ctl	FPC Ctl	FPC Ctl	FPC Ctl		BFE		FLOAT
Mon	R CO R CO R CO Bw Bw Bw	T2 T2	C2 C2	Ac CK T3 B C1	T3 B D1 P T C4 C1	D4	Bc 5	03 M8	SH C4 C4 C3	K K K		Tw Rc T1 Tw Rc T2 Tw Rc T3	C5 C5 C5	A CO O2 L	5 5	F5	
Tue	R CO R CO R CO Bw Bw Bw	T2 T2	C2 C2	Ac CK T3 B-Engel Ac CK T3 B C1	D1	T T4	D7	Bc 5	03 M8	SH C C3 C4	K K K		Sean Tw Rc T1 Tw Rc T2 Tw Rc T3	C5 C5 C5	A CO O2 L	5 5	Brian SK-Uhi Experim
Wed	R CO Bw R CO Bw R CO Bw C5 C5 C5	T2 T2	C2 C2	Ac T3 CK C1 B-Engel Ac CK T3 B C1	D1	T T4	D4 C4 C4	Bc 5	03 M8	SH C C3	K K K		Rc T1 Rc T2 Rc T3	C5 C5 C5 C5	O2 L A CO A CO O2 L	5 5	
Thur	R CO Bw R CO Bw R CO Bw BB BB &5	T2 T2	C2	Ac T3 CK B-Engel Ac CK T3 B C1	D1	T T4	D4 C1 C4 C4	Bc 5	03 M8	SH C C3	K K K		Rc T1 Rc T2 Rc T3	C5 C5 C5	L A CO B O A CO L	S 06 S 04	F6 H12 H15
Fri	R CO Bw R CO Bw R CO Bw BB BB M8 M8	T2 T2		Ac T3 CK B-Engel	T T4	D4 D8 M0	Bc 5	03 M8	SH C C3	K K K		C1 C2 C2	C5 C5 C5 C5	O2 L A CO A CO O2 L	5 S 04		
Sat																	

QUOTA

Rooster R	Brendan J	Matt M	Gavin G	Daniel B	TonyW TW	Kerry K	Shane S	Mike E	David W	Brad BW	Jason JH	Mark MB	Phil P	GlenD GD	GarryS GS	R Crabb RC	B Crabb BC	C Mooi C
T&M T1	T&M T2	T&M T3	T&M T4	CK L	Trevor T	Dinos D1	Dinos D2	Dinos D3	Dinos D4	Cuxson C1	Cuxson C2	Cuxson C3	Cuxson C4	Cuxson C5	Angelo A	Lou L	CDI CDI	C Doyl CD

1) This Transport Schedule is prepared to best manage fatigue risk while achieving company/customer obligations to supply logs.
2) The preparation of this transport schedule is done in accordance with IMS Procedure QP-1-05 to satisfy the requirements for fatigue management under the WA Heavy Vehicle Accreditation Scheme.

The current Overall Equipment Effectiveness for a truck in the weekly allocation of start to finish times varies. OEE measures The Plantation Logging Company use telemetrics to monitor their truck movements.

Figure 1: The weekly planning sheet compiled by a workshop participant

Summary of Metrics:

Truck Number

1 Cuxson - CE 02
2 Cuxson - CE 04
3 Cuxson - CE03
4 T02 - MAN 8x8 - (Logs)
5 T14 - MAN Tandem Drive - (Logs)
6 T20 - MAN 8x8 - (Logs)
7 T21- MAN 8X8 - (Logs)
8 T22 - Kenworth K108 - (Logs)
9 T23 - Kenworth K108 - (Logs)
10 T24 - MAN 8x8 - (Logs)
11 T25- MAN 8x8 - (Logs)
12 T26 - MAN 8x8 - (Logs)
13 T27 - Kenworth K200 - (Logs)
14 T30 - Kenworth K200 - (Logs)
15 T34 - Kenworth K200 - (Logs)
16 T38 - Kenworth K200 - (Logs)
17 T40 - IVECO 8X8

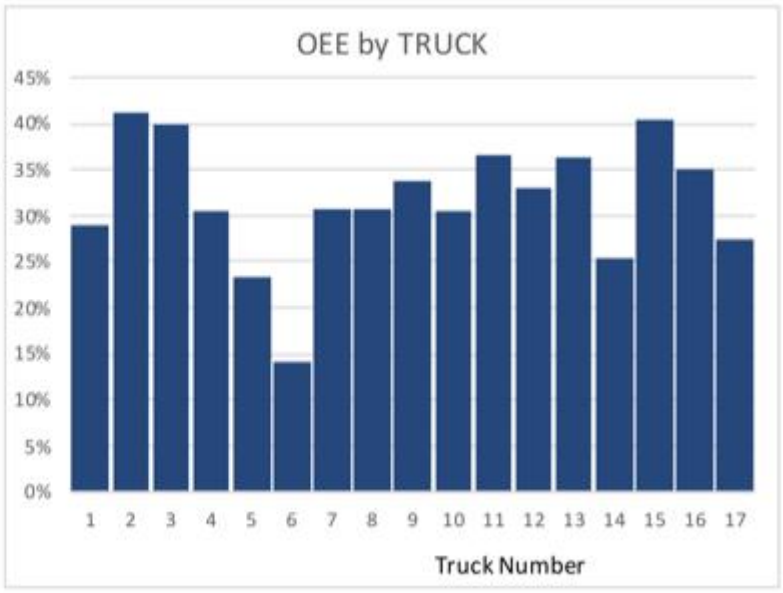


Figure 2: The utilisation of the truck fleet sampled from a single day of 19th February 2019.

Opportunities for improvement:

The OEE measures the percentage of time the truck is driving loaded and the following range was Opportunities for Improvement:

The opportunity is to:

1) Scientifically allocate the drive routes based on actual drive time data.
2) Integrate the plan into "Actual" performance measures and quantify wasted opportunities.
3) Have centralised co-ordination of the fleet to make situational decisions with a greater number of alternatives available.

Key Observations – Softwood Log Haulage Pickup

Method of observation: Observation of contractor PLC runs, interviews and hand recorded data.

What we saw:

A very streamlined and error free operation was demonstrated. The logs were staged for collection at two predefined locations. One of the locations loaded 3 bays using a forwarder that was waiting for the truck. The other location was loaded by a forwarder that was supporting a harvester and stopped helping the harvester to load the truck. This site was feeding more trucks than planned as there was a bushfire the previous week in a neighbouring plantation harvest site.

Start Time	Activity	From	To	Arrive OD
7:02	Drive Empty	PLC Main Yar	Madment	411828
8:14	Position to load			72
8:26	Wait			
8:43	Load Front 4'00"			
8:47	Move to Load			
8:54	Wait for truck in front			
9:02	Load Rear 2 & Dolly inc sign			
9:10	Move Off	Madment	Acess Track	
9:15	Strap Up			
9:26	Drive Loaded 66t load			
9:38	Adjust Straps			
9:43	Stop Make Phone calls / text			
9:47	Drive to Wespine	Acess Track		
10:07	Delay Roadworks			
10:13	Drive to Wespine		Wespine	
11:53	Unstrap @ Wespine			411907
12:01	Wait to unload			
12:05	Unload			
12:28	Finish Paperwork			
12:31	Clean Down			
12:34	Drive off empty			
12:45	Arrive Yard			411913

Figure 3: The Observation Sheet

Figure 4: Waiting for a previously loaded truck to depart before entering to load

Figure 5: The driver finishing paper work in the cab while being loaded. Loading 2 logs per lift.

Figure 6: The loader using the uprights to determine load height.

Figure 7: Both drivers waiting to each do paperwork.

Figure 8: Adjusting the straps.

Figure 9: Waiting to unload at Wespine.

Analysis:

The value add time was 40% of the total run cycle. The average speed loaded with the 66t GVM was 33km/h combining the access road and access track. The same roads with an empty truck averaged 60km/h (not counting the delay for road works).

Manual strapping, adjusting, and unstrapping took 26 minutes for the run.

Summary of Metrics:

Total Trip Time (Yard to Exit Wespine): 5h 43min

Value Add Time: 2h 17min

Incidental necessary time 0h 49min to inspect load, strap, unstrap, sweep

Opportunities for improvement:

Auto strapping units on the standard trailers would save 20 minutes per run

Key Observations – Softwood Haulage Drop Off at Wespine

Method of observation: Observation, interviewing the unload operator at Wespine Moore Rd, Dardanup depot and reviewing telemetric data.

What we saw:

The truck stopped in the unstrap area and was queued behind one truck being unloaded and one more truck in front waiting to be unloaded. After spending 8 minutes unstrapping the truck waited an additional 4 minutes to drive ahead and wait to be the next truck to unload. After 9 min 15 sec the truck drove forward to be unloaded. The driver then got out of the truck and walked to a defined location and 1min 35sec later the unloader makes contact. The first move was to unload the centre bay with one movement. The first two bays were unloaded and placed on the ground next to the Wespine infeed unit. The third bay was loaded directly onto the infeed unit.

The operator sends an email of the loading plan and this is circulated to 26 recipients on a mailing list on the Wespine loading plan schedule

Figure 1: The last (third) stack of the previous truck gets taken across to the other side of the unload pad.

Figure 11: The first bay to be unloaded is the centre bay. It is placed on the ground next to the in-feeder.

Figure 12: The front bay is unloaded also to the ground.

Analysis:

5 Why's problem solving

Question 1: Why are logs placed on the ground?

Answer: To help get the trucks out quicker.

Why? Because the unloader can catch up when there is a gap.

Why? Because there are gaps

Why? Because the trucks arrive at uneven intervals

Why? Because the trucks arrive without slots during the day and arrived in waves

Why? Because a fire at a nearby coup diverting trucks causing a different truck arrival pattern.

Why? Because an unscheduled event is the norm and the weekly roster is updated daily however the start and finish times are difficult to alter.

Summary of Metrics:

Unstrap time:	8 minutes
Total gate To gate average time:	45 minutes
Unload Time observed:	9 mins 45 secs

Opportunities for improvement:

- Slot deliveries of the trucks to avoid uneven arrival.

  Currently the multiple contractors do not have visibility to achieve this. When benchmarking known best practice the NSW grain model and the Vic/Tas Forest models were discussed. The centralised model of scheduling truck movements known as "Central Dispatch" is a better solution. The alternative for the customer site to publish slots and then the contractors fill them up results in a spike of work burden for the contractors on the allocation day.
- Control the even deliveries of trucks on each day of the week. The recommended method is to centralise the scheduling.

Key Observations – Native Forest Haulage Cycle

Method of observation:

Observation

What we saw:

A traditional method of loading native forest logs. The road train was selected because of the shorter stanchion requirement of the customer. The shorter was required by the customer to allow for their equipment to unload the truck.

The road had tree tops, timber residue product (TRP) which was required to be cleared before the truck could access the loading area.

Analysis:

Activity	Arrive OD	Arrive Time	Duratio
Leave yard Burnside		8:03	
Drive to coupe		8:48	0:45
Wait for excavator to clean road - TRP over road		8:54	0:06
Move to position truck for loading		9:00	0:06
Start Loading front bay		9:21	0:21
Move truck to load back bay		9:22	0:01
Continue loading		9:32	0:10
Move truck to second last bay		9:33	0:01
Continue loading		9:45	0:12
Throw straps and clean		9:58	0:13
Drive down road		10:04	0:06
Fill in paperwork		10:08	0:04
Drive down forest road		10:25	0:17
Stop to check strap tension		10:27	0:02
Drive to weighbridge Dwellingup Sawmill		10:52	0:25
Weigh truck at weighbridge		10:56	0:04
Drive to FPC Customer		11:37	0:41
Position Loader and unstrap first bay		11:40	0:03
Position Loader and unstrap second bay		11:41	0:01
Position Loader and unstrap third bay		11:42	0:01
Position Loader and unstrap fourth bay		11:43	0:01
Unload		12:00	0:17
Reposition truck to continue unloading safely		12:02	0:02
Continue Unload		12:08	0:06
Stop unloading to remove fallen logs		12:09	0:01
Continue Unload		12:33	0:24
Sweep down truck → finish		12:35	0:02
Return to Burnside		12:55	0:20
Round Trip Time		**4:52**	

Value (Green)- Truck driving loaded	
Non Value (Orange) - Truck not driving loaded	

Summary of Metrics:

Value Add Time	1 hour 29 min
Round Trip Time	4 hour 52 min
Unload Sequence Time	58 min
% Value Add	30%

Observation

The unloading sequence was benchmarked against industry averages and it was found to have taken almost double the time. This was due to customer equipment and safety issues.

Opportunities for improvement:

Focus on many small improvements. Line up a series of improvement projects including optimising the stanchions on the trailers, and co-ordinate the harvests to optimise transport. TXM recommend a lean daily leadership process that accounts for exception to the benchmark including load and unload times. This information would be valuable to the contractor to better manage and problem solve delay events.

STAGE TWO - Working with the Project Team

Team Formation:

The Timber Precinct team appointed a cross functional team representing key leaders and subject matter experts from across the supply chain.

Forest Products Commission – Campbell Sanderson

Forest Products Commission – Chaz Newman

Plantation Logging Company – Jeff Loton, Dave Hughan & Tony Fergusson

Dawson's Logging - Bernie Dawson

Preston Chipping Company - Geoff Brookes

WA Plantation Resources (WAPRES) - Mort Neilsson

South West Haulage - Greg Smithers

Figure 23: The team present on the future state mapping day

2. Preparation, Scoping and Data Gathering: TXM worked with the team to gather data about the current state process for three value streams. This included gathering overall data on the processes including product volumes, routes, wait times and efficiency (% loaded kms).

3. Current State Mapping:

We spent a day with SW Haulage, The full team were full time on days 2 and 3 of this visit with participants required on days 1 for introductions.

A. Day 3-4: A two-day current state mapping workshop. This included a brief introduction to value stream mapping and lean thinking and then identified the key product and information flows in the three value streams. The group also undertook an analysis of the backload opportunities

B. Day 5: Completed the current state map and collection of additional process data and additional analysis and transport modelling.

4. Final Data Gathering: The Timber Precinct team then gathered more detailed information on the process necessary to complete the current state. This titled "Homework".

5. Value Stream Mapping Workshop: TXM then facilitated the team to finalise the current state map and develop future state maps for the three value streams. This included:

a. Current State Map Finalisation:

TXM facilitated the team to finalise the current state map incorporating all the data gathered. The current state map overlaid lead time, supply chain metrics and inventory. TXM then create a digitised version of the current state maps.

b. Future State Mapping:

TXM then coached the team through the TXM "Seven Steps to the Future State" process to developing a future state map of the end to end process. This included a high level overall value stream map as well as more detailed process designs of key activities that have a high impact on supply chain performance. This future state map included practical improvements and business controls as well as setting targets for key process metrics to track improvement. TXM then created digitised versions of the future state map and associated processes.

6. A3 Action Planning: TXM facilitated the Timber Precinct team to develop an overall A3 action plan for improvement as well as detailed A3 action plans for each of the key process areas across the three value streams. These A3 plans define the key recommendations, accountabilities and resources for these changes and the cost and other targets that need to be achieved.

OUTCOMES OF THE PROJECT TEAM IN STAGE TWO

Key Observations – Native Forest Haulage Planning

Method of observation:

Described process in the workshop

What we saw:

The pattern is a repetitive pattern giving each contractor certainty. The pattern is created four weeks in advance and then firmed up with subtle variation the week prior. Day to day variations during the week are directed from FPC. FPC is responding to daily customer requests. Mostly the deliveries to large customers are repetitive. The distributions of smaller saw mills and the restrictions to their receiving time is a key barrier to optimised scheduling of truck movements.

Analysis:

This repetitive method is an effective way of creating a pattern of efficiency. The cost of freight drives a behaviour of "full loads'. The misaligned opening times and customer variations in turn resonates waves of product flow in large batches.

Opportunities for improvement

Consolidating many smaller customers into an Integrated Timber Processing Yard (ITPY) will allow for more flexible allocation of product to be delivered to a single node in a greater operating timespan.

Centralise the planning of native haulage as well as softwood haulage.

Fleet Analysis – Backload Opportunities

Method of observation:

Workshop process to map all of the routes currently scheduled across native and softwood.

What we saw:

A map of haulage routes by type of vehicle.

Analysis:

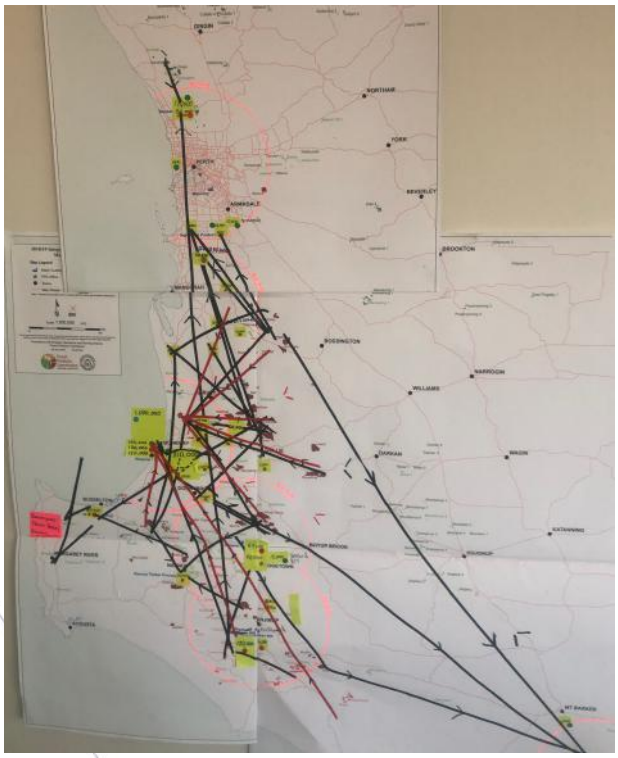


Figure 34: 'Spaghetti' map of the runs

Summary of Metrics:

The opportunities for improvement are limited with the current location of forest resources and backfill contacts. This shows the contractors are operating in an efficient manner.

Opportunities for improvement:

No short term significant opportunity. A hypothesis existed that there was opportunity to backload trucks with value adding runs. The team did a comprehensive 'spaghetti' map of the runs and there was only a very small opportunity for utilising the vehicle on the return portion of legs.

Fleet Analysis – Number of trucks

Method of observation:

Count up the trucks in the participant workshop process

What we saw:

A list of vehicles using the knowledge and experience of the people in the workshop.

Summary of Metrics:

	Road Train - Chip	Road Train - Log	Truck + Dog - Log	Grand Total
Dawsons Contracting		5		5
Midway	5			5
Others	14	5		19
PLC		38	6	44
SWH	4	25		29
Total Harvesting		14		14
Waugh		17		17
WFS		6		6
Wilsons	36	14		50
TOTAL	59	124	6	189

Opportunities for improvement:

This is a baseline of information. The benefits of % improvements can be equated to this baseline inventory of vehicles.

TXM STAGE TWO OBSERVATIONS & RECOMMENDATIONS

Observations

- Mature process with limited scope for new backloading

  The group were engaged positively, and each contributed to the analysis of the existing routes in order to find backload opportunities. The innovative actions by Wespine to reconfigure trucks to enable backfill of product on non-conventional trailers was discussed. Some people within the group were shocked by this outcome and the data was intently investigated to ensure the accuracy of the outcome.

- Current system prioritizes critical key equipment by having excess trucks

  Equipment including harvest, chippers and trucks are allocated to sites and routes. The allocation enables the return on investment of the chippers and harvesters be achieved. The contractors know the key success factor is to run the critical equipment for a targeted number of hours per day.

  The current system is in balance between the harvest and haulage equipment. In some cases the field and haulage contract with the same company results in a system that over supplies trucks to keep key equipment going.

  Lean thinking can create an operational tension within the current contract structure.

  The current balance represents a mature and optimized harvest and haulage process. This balance is achieved with the current balance of information, and limited time during each day to focus on efficacies by eliminating some key problems.

- Safety awareness behind industry midpoint standard

  It is acknowledged that there has been significant work undertaken in the area of safety within the industry over recent years. There is evidence the leadership within the sector is undertaking projects to take the industry beyond a safety compliance culture to a best practice in industrial safety culture.

TXM Recommended Future State

- Faster, more concise information will fine tune the current system.

  Applying lean thinking to the harvest and haulage value stream the following should be able to be achieved

  1. Harvesters and infield chippers are able to produce to their rated capacity. Delays to this equipment needs to be scrutinised and problem solved.
  2. .Truck turnaround time from 'coup to gate' needs to meet industry benchmark time 90% of the time. Loading equipment needs to operate to a standard allocation.
  3. Truck allocation needs to be based on the model. TXM believe there is excess trucks to maintain the return on investment on the most critical equipment.

  The current contracts are for a whole of harvest and haulage scope. There is valuable knowledge and experience amongst the current contractors

  The improved information provided to the contractors will enable better decisions and corrections made on a daily basis.

  Ideally the telemetrics will link to and be integrated with an industry planning tool. Real time telematics and real time planning will provide a new level of visibility for the existing contractors to make decisions resulting in a higher efficiency of the whole industry

  All raw data will be available to all contactors who utilize this infrastructure. The information will be presented is a standard format to all contractors. Contractors will work together to improve and optimise how this information is formatted and presented. Alarms will be triggered when industry benchmarks are not met. FPC will be a third party to this information and will link KPI's to this information. Contractors can further optimise this information to allow for competitive advantage.

- Specific recommendations from the project group are found in the following 10 'A3' Action Plans

Recommendations & Supporting Action Plans

- *Recommendation One - The development of an Integrated Timber Processing Yard be investigated*

  Supporting Action Plan

  Action Plan 1 - Develop an Integrated Timber Processing Yard

- *Recommendation Two - that analysis of central dispatch at??? be undertaken and to determine its appropriateness for a WA environment.*

  Supporting Action Plan

  Action Plan 2 - Central Dispatch

  Action Plan 3 - Electronic Docket Notes

- *Recommendation Three - standardize the management of achievement of benchmark turnaround times*

  Supporting Action Plan

  Action Plan 4 - Softwood Turnaround Time Improvement

- *Recommendation Four - in the short term trial monthly and weekly wood flow meeting while investigating a central dispatch system.*

  Supporting Action Plan

  Action Plan 5 - Log Order Planning Meeting

- *Recommendation Five - the industry to ensure additional resources are available to continually improve occupational health and safety.*

  Supporting Action Plan

  Action Plan 6 - Safety Improvement

Activity Plans without specific recommendation

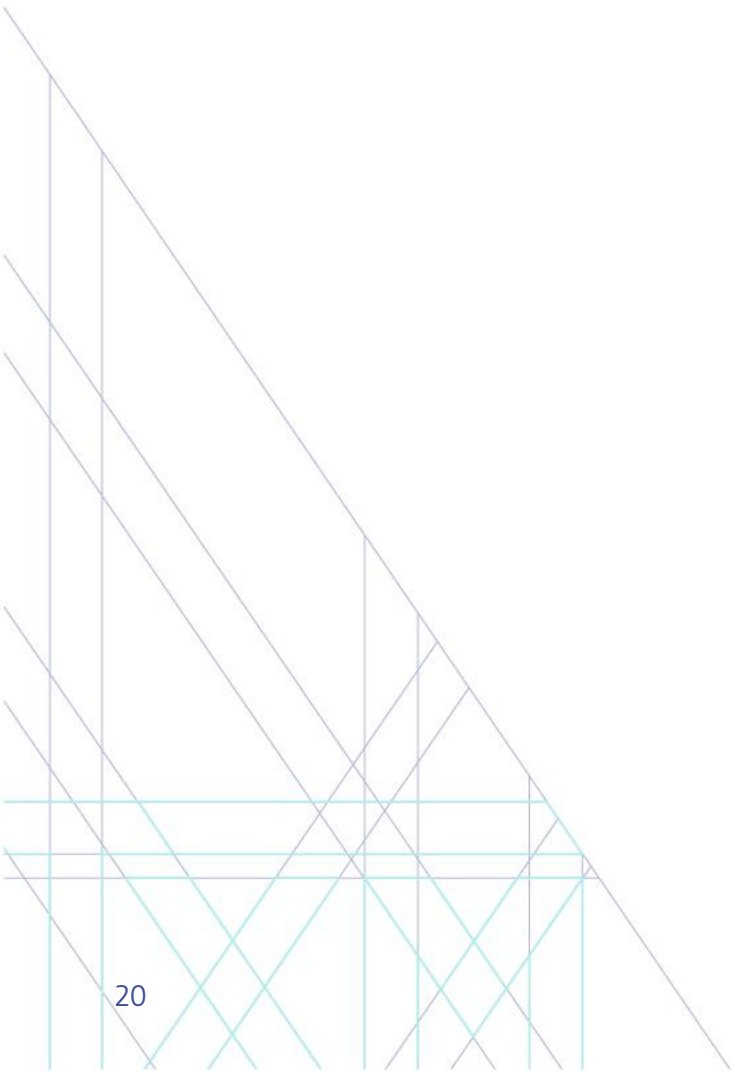
Action Plan 7 - Maximum Permissible Vehicle Access

Action Plan 8 - Standard Truck Design

Activity Plan 9 - Field Bin Redesign for In Field Chipping

Activity Plan 10 - Quicker Turnaround at Port for Chip

A3 ACTION PLAN – OVERALL



0

Lean A3 Action Plan for: SW Haulage Strategy 2021

TOTAL EXCELLENCE MANUFACTURING

Team

Campell, Anthony, & Wendy

Current State

What are the barriers in your business that are holding back profitable growth?

It is difficult to see the Waste of waiting and the waste of over processing. The Waiting occurs in the field and waste of overprocessing occurs in the planning. The Delivery In Full On Time is achieved in a weekly cycle with a high level of contingent vehicles and overtime to execute. The lack of KPI to measure safety and efficeincy allow the current state to be the status quo. Bottlenecks and uneveness throughout the week allow small events to escalate quickly into a major delay. The majority of Information is transacted using paper methods.

Future state

What is your strategic vision for your business? Describe your future business.

KPI's are used to plan and allocate schedules to best optimise people and vehicles. Standardisation in the processes extendeds to the vehicle specifications. Bottleneck at the port chip unload is relieved with a second grid and co-ordination of deliveries from the central control tower. This delivery co-ordination will reduce ramp (wiating) time for unloading at port, Wespine, and Integrated Yard. The control tower will combine the technology of contractor GPS signals to have a clear vision of all vehicles. Harvest and inventory information is also visible in real time. A repetetive slot pattern allows the existing routines to be optimised with minor adjustments. Wait times are monitored and KPIs influence contractor performance.
Trucks are optimised and measured by Percentage Loaded Kilometres. Freight movements reduce by 2-6% through the combination of many initiatives. An Integrated Yard makes it safer and cheaper for small operators to process timber and hire staff. Innovative industries have lower operating costs as they share facilities in the yard.

Obstacles

What are the barriers preventing you from achieving your future state?

The investment needed requires government & industry collaboration and favourable return on investment.The investment cycle under the Forest Management Plan runs in 10 year cycles adding risk to major investment. Drivers are difficult to recruit and retain. The allocation of resources needs to comply with national competetiveness laws.

Countermasures

Action	Responsible
Merchandising Yard created	FPC RAV Co-ordinator
Centralised Despatch planned, contracted, implemented, optimised	FPC RAV Co-ordinator
Truck specifications standardised	FPC RAV Co-ordinator
Transactional work flows usibng Electronic Docket Notes	FPC RAV Co-ordinator
Maximised Permissable Vehicle Access	FPC RAV Co-ordinator
Infield chipping fast load turn around	FPC RAV Co-ordinator
Monthly Log Order Planning Meeting	FPC RAV Co-ordinator
Safety Improved	FPC RAV Co-ordinator

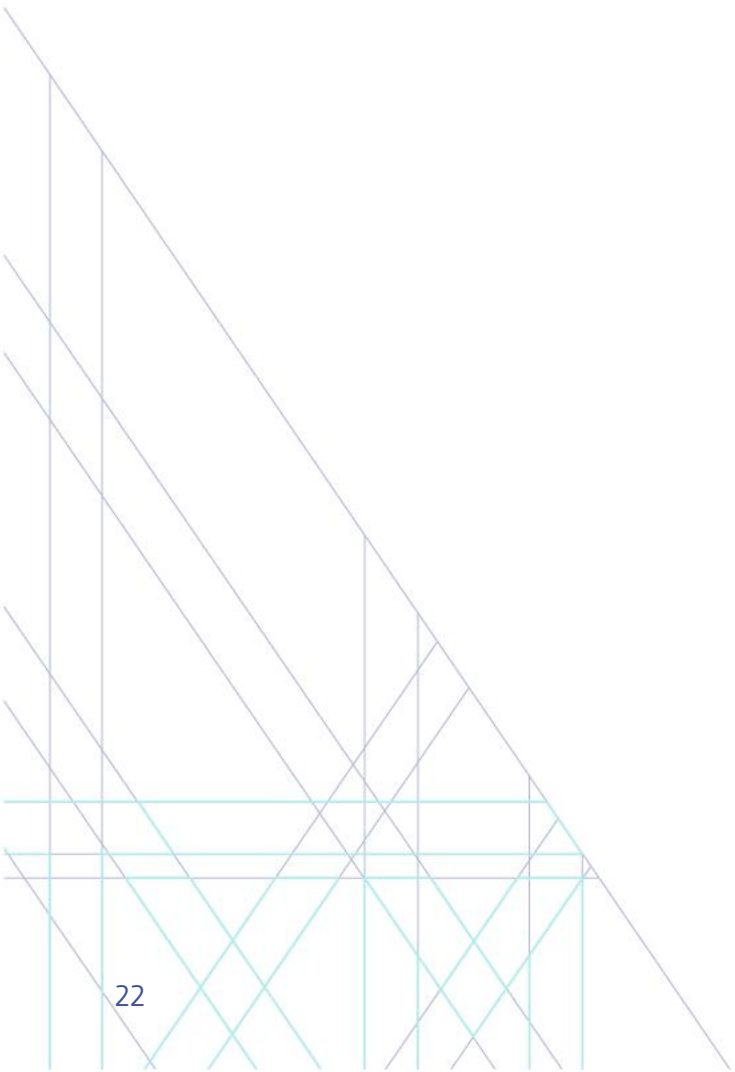
KPI / Follow up

Measure	Current State	Future State
Number of Trucks in the fleet required for 2019 vol	184	177
Truck % Loaded Kms	45	52
Wait times to load / unload - Softwood (minutes)	49	30

Action Plan

Category	Action Plan	Target	Resp.	Start Date	Due Date	Status
Align	Conduct a startegy sesison to prioritise and align reccomenda	Determined		July 19	Feb 20	
Plan	Identify Actions and Resources	Defined		Nov 19	Mar 20	
Do	Implemet working teams on agreed strategy	In Place		Mar 20	June 20	
Check	Routine governance of implementation project created	Aligned with KPIs		Mar 20	June 20	
Adjust	Maintain alignment, adjust to industry changes.	Routine Meet		June 20	June 27	

A3 ACTION PLANS - DETAILED



1

Lean A3 Action Plan for: Merchandising Yard(s)

TOTAL EXCELLENCE MANUFACTURING

Team

Bernie Dawson, Jeff Loton, Campbell Sanderson

Current State

What are the barriers in your business that are holding back profitable growth?

- Multiple product specifications & customers.
- Short stanchions to cater for customers unloading equipment (grab reach and width, yard surface, product type, load capacity etc).
- Trucks customised to haul native products (rough roads, large logs, varied customers).

Future state

What is your strategic vision for your business? Describe your future business.

- Merchandising yard established (~500 k tonne annual intake).
- Supports the standardisation of the truck fleet.
- Less products = less complexity and possibly better value recovery (from NF resource)
- Less in forest storage area required (reduced number of sorts).
- Improved truck turn around times.
- Increase in the percentage loaded kms (better truck utilisation).
- Maximise payloads
- Untethered harvest and haulage contracts, allowing trucks to uplift product from any site.
- Safer unload and loading - rationalised supply chain, with core fleet loaded by fit for purpose loading and unloading equipment.
- Equipment meets base level standards and where viable will be state of the art.
- Remove adminstration associated with heavy mass RAV permitts (many to one, as opposed to many to many route options).

Obstacles

What are the barriers preventing you from achieving your future state?

- Policies - support for the utilisation of biomass from native forests.
- Stakeholders - support of native forest harvesting.
- Existing customers - geared up for traditional products, with capacity to invest in higher specification limited.
- Location of Site - where is the most cost effective location.
- Effect seasonal weather has on supply to facility.
- Permits
- Scalability of merchandising yard;

Countermeasures

Action	Responsible
Open market access for customers;	
Create new industry; Merchandising Yard may create 80 - 100 FTE in Regional Town;	
Improve access - focused investment into road network.	
Improved customer service and flexibility to process and meet orders	
Identify location, design and develop optimal yard flows for merchandising yard	
Improved value recovery of products from the natural resource	

KPI / Follow up

Measure	Current State	Future State
Cost of production per aggregated product type (neutral or less)		
Improved value recovery (↑ $/tonne + yield/ha)		
Improved truck utilisation (% loaded km)		
Improved customer satisfaction		

Action Plan

Category	Action Plan	Target	Resp.	Start Date	Due Date	Status
	Trials on IRR / Cost Benefit					
	High level layout and Flow Map					
	Create business case					
	Fund to support project mgt & research					
	Quantify benefits					

2

Lean A3 Action Plan for: Central Dispatch (increase backloading)

TOTAL EXCELLENCE MANUFACTURING

Team

Wendy Perdon, Mort Neilson, Chaz Newman

Current State

What are the barriers in your business that are holding back profitable growth?

• Contractors schedule their trucks based on what compartments / coupes they have access (tethered harvest and haulage operations)
• Contractors schedule their own trucks, with no visibility of other operations.
• Growers have limited information on stock location or age.
• Customers may, from time to time get bombarded with trucks due to uncoordinated scheduling - resulting in inefficieny across the supply chain (supply is lumpy).

Future state

What is your strategic vision for your business? Describe your future business.

• Trucks are despatched centrally i.e. one body coordinates all truck movements on a daily basis.
• Trucks untethered and made available by contractors to uplift product to optimise supply to customers and truck utilisation
• Central despatch supports improved woodflow and value recovery.
• Stakeholders across the supply chain have real time data on deliveries and bottlenecks which supports improved redirection of resources and safety.
• Trucks will be scheduled to blocks, to be loaded out by the harvesting contractor to uplift order.

Obstacles

What are the barriers preventing you from achieving your future state?

• Differences in products, sites and terrain.
• Current fleet is highly variable
• Customers unloading equipment
• No EDN product
• Route permit process, curfews and inductions
• Loading process may need review.

Countermeasures

Action	Responsible
Standardised induction and training process	
Blanket permits for trucks, streamlining efficiencies	
Accurate, real time information transfer e.g. stick, site location, locat'n	
Transparent communication	
Optimised truck utilisation, increasing % loaded and reducing idle.	

KPI / Follow up

Measure	Current State	Future State
Percentage loaded kilometers		
Improved utilisation of trucks during legal delivery hours		
Loading times	100%	
Number of trucks required to execute the freight task		
Unloading times		

Action Plan

Category	Action Plan	Target	Resp.	Start Date	Due Date	Status
	Trial monthly and weekly woodflow under existing systems (establish a base line)					
	Model and determine benefits of central dispatch management system					
	Implement EDN					
	Establish industry action group to define how effective CD has been in NSW and the GT					

3

Lean A3 Action Plan for: Electronic Docket Notes (EDN)

TOTAL EXCELLENCE MANUFACTURING

Team

Chaz, Campbell

Current State

What are the barriers in your business that are holding back profitable growth?

- FPC docket notes are paper based.
- High queries (error rate), low accuracy.
- Delayed input - by all parties (FPC / Contractor / Mill).
- No 'real' visibility of information; unable to support effective (woodflow) decision making.
- Duplication of data entry and validation across stakeholders.

Future state

What is your strategic vision for your business? Describe your future business.

- Establish an mobie based Electronic Docket Note (EDN Solution)
- Support real time information / reporting.
- Include functaionallity and/or telematic information to reduce amount of fields that need to be capctured by the driver i.e. GPS tracking, georefrencing.
- Information accessable to multiple users across the supply chain, based on administrative righst and securities.
- Deliveries (mass/scanned date) verificated automatically i.e. weighbridge verification.
- Linkage to central dispatch.

Obstacles

What are the barriers preventing you from achieving your future state?

- No existing EDN framework to build off - need to implement and upskill stakeholders from stratch.
- No data validation systems in place e.g. weighbridge. These need to be identfied and developed before going to EDN.
- Challenges in identifying and initiating a solution that best suits the needs of the wider WA Forest Industry.

Countermeasures

Action	Responsible
Set project milestones & deadlines for implementation	Campbell Sanderson
Specifiy current base spec & future spec	
Link to real time wood flow dashboard showing metrics and data	
Trial and define Real time wood flow management	

KPI / Follow up

Measure	Current State	Future State
Accuracy (error rate) - number of queries per month		
Truck Turn Around Times reduce		
Lead time to process D-Note	2 Days	60 mins

Action Plan

Category	Action Plan	Target	Resp.	Start Date	Due Date	Status
	FPC to go to market to secure a Custom of the Shelf (COTS)			20/5/19	31/12/19	On-Track
	FPC, in collaboration with FIFWA to implement a project to iden			10/6/19	10/9/19	On-Track
	Once verification project concludes, FPC/FIFWA to work with			10/9/19	31/12/19	On-Track

4

Lean A3 Action Plan for: Softwood Turnaround Time Improvement

TOTAL EXCELLENCE MANUFACTURING

Team

Jeff, Tony, Campbell, Wespine

Current State

What are the barriers in your business that are holding back profitable growth?

• On 19/02/2019, 14 deliveries ave. 25.7 minutes
• 43 minutes unloading time, incl. 24 minutes wait
• Nomally, unloading is not an issue however when there is a breakdown (of scanner) or uneven scheduling of trucks it becomes a problem.

Future state

What is your strategic vision for your business? Describe your future business.

• Best turnaround time is ~20 min.
• Service level agreement specifies 90% of deliveries must be <20 minuites
Auto Strapping;
Auto Blowers;
Slot Schedules and Slot Queue and Random Queue (not FIFO);
Bark on stroage area is suited to in feed level of scanner. Scan by load.

Obstacles

What are the barriers preventing you from achieving your future state?

•Scheduling of trucks is not coordinated
•
• Trucks queue up for four reasons:
a) catching up due to earlier delays in harvesting / sawmill i.e. not pro rata
b) campaigning deliveries towards end of teh week;
c) Payment method (scanned volume)
d) schedule of deliveries are at the discretion of the contractor

Countermeasures

Action	Responsible
Level trucks to avoid queing / limit campaigning following an event	
Real time broadcast of trucks waiting to be unloaded / delays	
Standard "Plan B or C Playbook" if there is congestion at Wespine	
Align KPI's and penalties to drive desired behaviours	
Wespine to reconsider how they laydown product pre the scanner when there is congestion	

KPI / Follow up

Measure	Current State	Future State
Average truck turn around time at mill		
Metrics of times that trucks queue before being 'unloaded'		

Action Plan

Category	Action Plan	Target	Resp.	Start Date	Due Date	Status
	Measure and confirm turnaround times (PLC)					
	Ensure that telematic geofences are consistent					
	Condust time in motion study					

5

Lean A3 Action Plan for: Log Order Planning Meeting (LOPM)

TOTAL EXCELLENCE MANUFACTURING

Team

FPC Production Managers, Contractors (PLC, Total Harvesting, SLS, Browns)

Current State

What are the barriers in your business that are holding back profitable growth?

- Log orders (harvest / transport plans) developed without contractors input.
- Log orders seem to be modified weekly without any thought process.
- Minimal performance reporting

Future state

What is your strategic vision for your business? Describe your future business.

- Contractors are involved (provide input) into the log order process e.g. mix from the bush, production / truck capacity etc.
- Log order reviewed weekly by stakeholders.
- Performance reporting provided,

Obstacles

What are the barriers preventing you from achieving your future state?

- Avaliablity - conflicting priorities and time consuming process.
- Accurate delivery information availablity
- Effective woodflow system.

Countermeasures

Action	Responsible
Monthly log order meeting with contractors	
Weekly feedback / performance report	
END to be implemented by H2 FY20	
Visual management board e.g. THAT meeting at Preston's chipping	

KPI / Follow up

Measure	Current State	Future State
Weekly actual delivery within ± 10% of order		
Monthly actual delivery @ 100% of order		

Action Plan

Category	Action Plan	Target	Resp.	Start Date	Due Date	Status
	Implement EDN					
	Arrange a monthly meeting with contractors to discuss planne					
	Develop metrics (dashboards) that can be used to measure p					
	Contact contractors on a weekly basis to discuss woodflow fo					

6

Lean A3 Action Plan for: Safety Improvement

TOTAL EXCELLENCE MANUFACTURING

Team

Campbell Sanderson

Current State

What are the barriers in your business that are holding back profitable growth?

- ~61 native customers and unloading procedures and equipment.
- ~ 189 trucks, many with limited or no telemetrics
- A large protion of the fleet is old, without the latest safety features
- High incident of truck roll overs in the forestry industry
- Vehciles vary signficiantly

Future state

What is your strategic vision for your business? Describe your future business.

- Industry best practice re truck safety equipment and design.
- Driver training and support best in the industry
- Telematics are used as a tool to support the management of driver fatigue.
- Customers unloading equitment is fit for purpose, supporting efficient and safe unloading of all deliveries.

Obstacles

What are the barriers preventing you from achieving your future state?

- High cost of equipment, with uncertainty on the investment horizon.
- Varying standards across growers, contractors and customers re equipment requirements and standards.
- Different specifications, results in an array of different unloading equipment requirements
- Many smaller customers are unable to spec up their log yard or purchase new unloading equipment, as their scale would not warrant the capex.

Countermeasures

Action	Responsible
Standardised vehicles, which meet best in class safety standards	
Merchandising yard established, reducing the need to deliver product to multiple customers (rationalisation)	
Telemetrics included on all trucks - providing contractors with tools to better manage fleet.	
Industry working towards best practice safety equipment e.g. EBS, on-board cameras, etc.	
Auto load tensioners to support load restraint and reduce driver exposure to injury	
All vehciles to meet a minimum specification by a certain date	

KPI / Follow up

Measure	Current State	Future State
Gather information on all vehicles used to cart forest products e.g. truck and trailer age, tare mass, safety equipment etc.		
Increase the number of vehicles using telematics		
Increase the number of trucks with cameras		
Increase the number of trucks with EBS		

Action Plan

Category	Action Plan	Target	Resp.	Start Date	Due Date	Status
	Record and analyse the composition of the existing fleet					
	Industry to meet to establish what the best practice safety req					
	Develop a training schedule to support driver training					
	Assess what unloading equipment is used by customers, inclu					

7

Lean A3 Action Plan for: Maximum Permissible Vehicle Access

TOTAL EXCELLENCE MANUFACTURING

Team

FPC RAV Co-ord, Main Roads HVS, FIFWA, Local Gov't, Chaz

Current State

What are the barriers in your business that are holding back profitable growth?

Place restrictions around road trains to increase their roads.N12:V14

Future state

What is your strategic vision for your business? Describe your future business.

- Heavy vehicle access to all roads deemed safe;
- Improve critical / aterial roads to satisfy heavy vehcile access;
- Main Roads and Forest Industry aligned on addressing critical issues;
- Risk of going to smaller vehicles will increase costs and viability of forest sector;
- Native Forest costs forecast to increase betwer $3m to $5m annually.
- Pine Forest cost increase by $10 m; (+$10 / tonne)
- Hardwood Plantation cost increase by $7 m; (+$7 / tonne)

Obstacles

What are the barriers preventing you from achieving your future state?

- Main roads risk aversion;
- Resourcing to inspect roads limited (leading to lengthly delays in getting feedback);
- Local government inconsistency;
- Lack of co-ordiantion between road users;
- Liability / risk / worksafe issues;
- Current, sub-optimal standard or roads.

Countermeasures

Action	Responsible
Develop working group to review transport requirements	
Investigate Albany TROG model;	
Place restrictions around road trains to increase their roads.	
Benchmark safety management and promote benefits	
Promote benefit of a standardised truck design	
N12:V14	

KPI / Follow up

Measure	Current State	Future State
% forest products transported by road trains;		
Number of trucks on the road		

Action Plan

Category	Action Plan	Target	Resp.	Start Date	Due Date	Status
	Quantify the costs / risks associated with the more of the exis					
	Develop working group to lobby with government stakeholders					

8

Lean A3 Action Plan for: Standard Truck Design

TXM TOTAL EXCELLENCE MANUFACTURING

Team

Bernie Dawson, Jeff Loton, Campbell Sanderson

Current State

What are the barriers in your business that are holding back profitable growth?

- Multiple designs and configurations, customised to native & plantation operations.
- Some configurations are outdated, with high tares & limited safety features.
- Cross-sector utilisation of trucks is currently limited.
- Haulage contracts largely tethered to own harvest operations.

Future state

What is your strategic vision for your business? Describe your future business.

- Universal truck & trailer combinations to allow flexibility across both forest types.
- Future-orientated safety & efficeincy systems standard (best practice equipment)
- Maximium permissble loads achievalble on each delivery.
- Supports connectivity for Eletronic Docket Notes (EDN).
- *Transition fleet to align with business/industry needs.*

Obstacles

What are the barriers preventing you from achieving your future state?

- Cost vs Investment horizons (uncertainy re future haulage security).
- Uncertainty of regulations (RAV infrastructure).
- Unloading capacity and equipment used by customers.
- Merging of forest sector supply chains (roads, specifications etc)
- Product lengths are highly variable.

Counter measures

Action	Responsible
Improve safety and efficiency of systems - utilisation of EBS, scales, telemetrics etc.	
Lower centre of gravity and improved stability (SRT)	
Quick strapping / auto strapping system	
Stantion height standard (maximum premissable height) or adjustable	
Leverage central dispatch to support optimal use of fleet	
Review of customers unloading equipment	

KPI / Follow up

Measure	Current State	Future State
% loaded kilometers		
Customer unloading times		
Fleet register to capture vehicle make, model, configuration, maximum permissable mass, age and stanchion height.		

Action Plan

Category	Action Plan	Target	Resp.	Start Date	Due Date	Status
	Implement EDN, so that more accuratedelivery information is available					

9

Lean A3 Action Plan for: Field Bin redesign for In Field Chipping

TXM TOTAL EXCELLENCE MANUFACTURING

Team

Mort, Greg

Current State

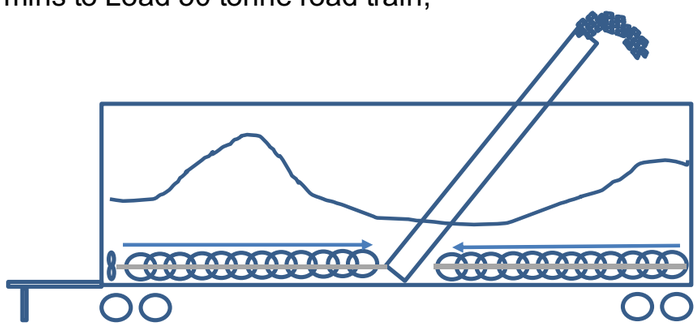
What are the barriers in your business that are holding back profitable growth?

2 Hours to load 50 tonne road train
TXM: Mindset that Forest Industery equipment is expensive and highly engineered;

Future state

What is your strategic vision for your business? Describe your future business.

15 mins to Load 50 tonne road train;



Obstacles

What are the barriers preventing you from achieving your future state?

Countermasures

Action	Responsible
150 cub metres	

KPI / Follow up

Measure	Current State	Future State

Action Plan

Category	Action Plan	Target	Resp.	Start Date	Due Date	Status

10

Lean A3 Action Plan for: Quicker Turnaround at Port for Chip

TXM TOTAL EXCELLENCE MANUFACTURING

Team

Mort, Greg

Current State

What are the barriers in your business that are holding back profitable growth?

- 1 x Screen to unload trucks

Future state

What is your strategic vision for your business? Describe your future business.

- 2 x Grids to speed up unloading process
- Side tippers - tip whole trailier onto 15 grid
- Establish static chipper at port, to chip log directly into stockpile

Obstacles

What are the barriers preventing you from achieving your future state?

- Space at port to build 2nd grid
- Cost of installing a second grid
- Contingency plan to construct second grid, without unfavoruably affecting export operations

Countermeasures

Action	Responsible
Improved truck utilisation (less trucks required)	
Provides additional capacity to scale up when needed	

KPI / Follow up

Measure	Current State	Future State
% wood carried on road trains;		

Action Plan

Category	Action Plan	Target	Resp.	Start Date	Due Date	Status

VALUE STREAM MAP – CURRENT STATE

Future State Map - Bunbury Forrest Products Haulage - Easter 2021

Workshop Team

Bernie Dawson, Chaz Newman, David Hughan, Jeff Loton, Geoff Brookes, Greg Smeathers, Morten Nilsson, Campbell Sanderson, Anthony Clyne (TXM)

Created 9 April, 2018

Forest Officer

SW Haulage

Dawson Contracting

Plantation Logging Co (David Haughan)

HAULAGE / HARVEST CONTRACTORS CREATE PLAN

PLC - Weekly on Friday (DAVE)

Weekly Phone Call

Weekly Email

Weekly Summary Report

FPC Weekly | WA PRES Weekly

Weekly on Friday

Steve

Process until Darkness / Wet

Bernie

Daily

PREVIOUS DAY

MORNING PRE START

SAME DAY

Field count and estimate harvest tonnage

In field Logs Softwood 1.5 days total

66% Stock to Truck

In field Logs 1.5 days total

Auto Strap

33% Direct Forward Bunker to Truck

ELECTRONIC D-NOTES

D- Note Weighbridge

C/T = 3 min

Fleet OEE PLC 31%	Road Train - Chip	Road Train - Log	Truck + Dog - Log	Grand Total
Dawsons Contracting		5		5
Midway	5			5
Others	14	5		19
PLC		38	6	44
SWH	4	25		29
Total Harvesting		14		14
Waugh		17		17
WFS		6		6
Wilsons	36	14		50
TOTAL	59	124	6	189

STRUCTURED SHORT

Contractor safety & How weeting

30 minute

Confirm Capacity for rolling three months By Plantation, by Coupe, by Contractor

Communicate Contractors

Woodflow Planning

4 Hours Doing

STRUCTURED

Prepare Capacity for rolling three months By Plantation, by Coupe, by Contractor

Wood Flow Monthly Meeting

30 minute std agenda

INTEGRATED SAFETY

Rolling 3 month Volumes Special Events (Shutdowns, Slowdowns) External Factors Safety Dashboard

Dropbox 1 day Prior Excel File

Wespine

Total Native

655k0 Tonnes p.a.

Log 505k,

Debarked Residue Chip 150k,

Biomass 0k

Sawlog Karri	50k Tpa	Log	
Sawlog Jarra	138k	Log	
LVL Karri	30k	Log	
Firewood	70k.	Firewood	
Biomass Karri.	70k.	Chip	
Simcoa Charlogs.	35k.	Log	
Simcoa TPR.	65k.	Chip	
Simcoa PCC. (Debarked Residue)	40k.	Log	

Total Hardwood

2.1m Tonnes p.a.

Log 1.1m,

Chip 1m

Biomass 70k

BLUEGUM			
BUNBURY	Log	Chip	
WA PRES	400k	200k	
Bunbury Fibre.	300k.	100k	
Bio Mass	0	70k	

Total Softwood

1,092,000 Tonnes p.a. (same as 2019)

Log 982k, Chip 110k, Biomass 60k

Wespine. 100k + 420k«. 520k

Wesbeam. 170k

Laminex 95k

(Chip SSk + Wespine 40k)

Need to clarify

WA PRES Preston 12k Chipping

Albany 120,000 tpa

Simcoa 50k

Poles 7.5k

Rounds 23k (Timber Treaters) Minorba Jetstar Heston Jetstar Mundajung

Laminex 300T

WA Pres 1000T

Simcoa 1000T

Total 3 Piles

SOFT WOOD & NATIVE FOREST

Pre Start | Travel Empty | Load Bay 1,2,3,4 | Auto Strap | Drive To Forest Exit | Safety check | Drive to customer

SOFT WOOD

Slot | Stop - Go | Weigh Truck (stop go) | Wait & Move | Unload | Wait for Driver | Drive Forward | Auto Blower Sweep Off | Safety Check | Weighout (Tare)

NATIVE FOREST

Integrated Timber Processing Yard

ITPY

Softwood

10	62	0	12	8	10	5	83	180	37 mins	No Delay Cycle Time
10	62	0	12	8	10	5	83	192	51 mins	Lead Time inc Delays / Waiting

Native

0	0	0	12	0	0	0	0	12	29 mins	No Delay Cycle Time
0	0	0	12	0	0	0	0	24	31 mins	Lead Time inc Delays / Waiting

Weigh Truck (stop go) | Unload | Drive Forward | Auto Blower Sweep Off | Safety Check | Weighout (Tare) | Back Load % Trucks | Supermarket

Auto Blower

6	6	8	1	3	3	5	5		37 mins	No Delay Cycle Time
6	6	12	8	1	3	1	3	1	5	5		51 mins	Lead Time inc Delays / Waiting

Port

QUICK TURN AROUND BINS

AUTO TARP

Pre Start | Travel Empty | Announce Arrival @ Coupe | Travel & Turn Around | Complete D Note & Admin | Load Lead Trailer | Load Rear Trailer | Move to settle load | Check & Tarp load | Drive | Onroad Delays

10	0	0	10	5	15	15	10	1	130	10	206	
10	0	0	10	5	30	15	15	10	1	130	10	236	

6	6	6	1	3	3	5	5		29 mins	No Delay Cycle Time
6	0	6	1	3	1	3	1	5	5		31 mins	Lead Time inc Delays / Waiting

2nd grid

6	30	1	3	3	5	5		53 mins	No Delay Cycle Time
6	7	30	1	3	1	3	1	5	5		62 mins	Lead Time inc Delays / Waiting

Softwood Sector

Annual Volume	1,000,000
Business Days	230
tpd	4,348
tphr	21,739

Average Payload (tonnes)

Tons/Day	42	43	44	45	46	47	48	49	50
1.2	87	85	83	81	79	78	76	74	73
1.3	80	78	77	75	73	72	70	69	67
1.4	74	73	71	70	68	67	65	64	63
1.5	70	68	66	65	64	62	61	60	58
1.6	65	64	62	61	60	58	57	56	55
1.7	61	60	59	57	56	55	54	53	52
1.8	58	57	55	54	53	52	51	50	49
1.9	55	54	53	51	50	49	48	47	46
2.0	52	51	50	49	48	47	46	45	44
2.1	50	49	48	47	46	45	44	43	42
2.2	48	46	45	44	43	43	42	41	40
2.3	46	44	43	43	42	41	40	39	38
2.4	44	43	42	41	40	39	38	37	37
2.5	42	41	40	39	38	38	37	36	35
2.6	40	39	39	38	37	36	35	35	34
2.7	39	38	37	36	36	35	34	33	33
2.8	37	37	36	35	34	34	33	32	32
2.9	36	35	35	34	33	33	32	31	30
3.0	35	34	33	33	32	31	31	30	29

Native Forest Sector

Annual Volume	500,000
Business Days	230
tpd	2,609
tphr	13,043

Average Payload (tonnes)

Tons/Day	42	43	44	45	46	47	48	49	50
1.2	52	51	50	49	48	47	46	45	44
1.3	48	47	46	45	44	43	42	41	41
1.4	45	44	43	42	41	40	39	39	38
1.5	42	41	40	39	38	38	37	36	35
1.6	39	38	38	37	36	35	34	34	33
1.7	37	36	35	35	34	33	33	32	31
1.8	35	34	33	33	32	31	31	30	29
1.9	33	32	32	31	30	30	29	29	28
2.0	32	31	30	29	29	28	28	27	27
2.1	30	29	29	28	28	27	26	26	25
2.2	29	28	27	27	26	25	25	25	24
2.3	28	27	26	26	25	25	24	24	23
2.4	26	26	25	25	24	24	23	23	22
2.5	25	25	24	24	23	23	22	22	21
2.6	24	24	23	23	22	22	21	21	21
2.7	24	23	22	22	22	21	21	20	20
2.8	23	22	22	21	21	20	20	20	19
2.9	22	21	21	20	20	19	19	18	18
3.0	21	21	20	20	19	19	19	18	18

In-Forest Chip (Hardwood) Sector

Annual Volume	1,000,000
Business Days	230
tpd	4,348
tphr	23,730

Average Payload (tonnes)

Tons/Day	48	49	50	51	52	53	54	55	56
1.2	76	74	73	72	70	69	68	66	65
1.3	70	69	67	66	65	64	62	61	60
1.4	65	64	63	61	60	59	58	57	55
1.5	61	60	58	57	56	55	54	53	52
1.6	57	56	55	54	53	52	51	50	49
1.7	54	53	52	51	50	49	48	47	46
1.8	51	50	49	48	47	46	45	44	44
1.9	48	47	46	45	45	44	43	42	41
2.0	46	45	44	43	43	42	41	40	39
2.1	44	43	42	41	40	40	39	38	37
2.2	42	41	40	39	39	38	37	36	35
2.3	40	39	38	38	37	36	36	35	34
2.4	38	37	37	36	35	35	34	33	33
2.5	37	36	35	35	34	33	33	32	32
2.6	35	35	34	33	33	32	31	31	30
2.7	34	33	33	32	31	31	30	30	29
2.8	33	32	32	31	30	30	29	29	28
2.9	32	31	30	30	29	29	28	28	27
3.0	31	30	29	29	28	28	27	27	26

VALUE STREAM MAP – FUTURE STATE

Future State Map - Bunbury Forrest Products Haulage - Easter 2021

Workshop Team

Bernie Dawson, Chaz Newman, David Hughan, Jeff Loton, Geoff Brookes, Greg Smeathers, Morten Nilsson, Campbell Sanderson, Anthony Clyne (TXM)

Created 9 April, 2018

Forest Officer

SW Haulage

Dawson Contracting

Plantation Logging Co (David Haughan)

HAULAGE / HARVEST CONTRACTORS CREATE PLAN

PLC - Weekly on Friday (DAVE)

Weekly Phone Call

Weekly Email

Weekly Summary Report

FPC Weekly | WA PRES Weekly

Weekly on Friday

Steve

Process until Darkness / Wet

Bernie

Daily

PREVIOUS DAY

MORNING PRE START

SAME DAY

Field count and estimate harvest tonnage

In field Logs Softwood 1.5 days total

66% Stock to Truck

In field Logs 1.5 days total

Auto Strap

33% Direct Forward Bunker to Truck

ELECTRONIC D-NOTES

D- Note Weighbridge

C/T = 3 min

Fleet OEE PLC 31%	Road Train - Chip	Road Train - Log	Truck + Dog - Log	Grand Total
Dawsons Contracting		5		5
Midway	5			5
Others	14	5		19
PLC		38	6	44
SWH	4	25		29
Total Harvesting		14		14
Waugh		17		17
WFS		6		6
Wilsons	36	14		50
TOTAL	59	124	6	189

STRUCTURED SHORT

Contractor safety & How weeting

30 minute

Confirm Capacity for rolling three months By Plantation, by Coupe, by Contractor

Communicate Contractors

Woodflow Planning

4 Hours Doing

STRUCTURED

Prepare Capacity for rolling three months By Plantation, by Coupe, by Contractor

Wood Flow Monthly Meeting

30 minute std agenda

INTEGRATED SAFETY

Rolling 3 month Volumes Special Events (Shutdowns, Slowdowns) External Factors Safety Dashboard

Dropbox 1 day Prior Excel File

Wespine

Total Native

655k0 Tonnes p.a.

Log 505k,

Debarked Residue Chip 150k,

Biomass 0k

Sawlog Karri	50k Tpa	Log	
Sawlog Jarra	138k	Log	
LVL Karri	30k	Log	
Firewood	70k.	Firewood	
Biomass Karri.	70k.	Chip	
Simcoa Charlogs.	35k.	Log	
Simcoa TPR.	65k.	Chip	
Simcoa PCC. (Debarked Residue)	40k.	Log	

Total Hardwood

2.1m Tonnes p.a.

Log 1.1m,

Chip 1m

Biomass 70k

BLUEGUM			
BUNBURY	Log	Chip	
WA PRES	400k	200k	
Bunbury Fibre.	300k.	100k	
Bio Mass	0	70k	

Total Softwood

1,092,000 Tonnes p.a. (same as 2019)

Log 982k, Chip 110k, Biomass 60k

Wespine. 100k + 420k«. 520k

Wesbeam. 170k

Laminex 95k

(Chip SSk + Wespine 40k)

Need to clarify

WA PRES Preston 12k Chipping

Albany 120,000 tpa

Simcoa 50k

Poles 7.5k

Rounds 23k (Timber Treaters) Minorba Jetstar Heston Jetstar Mundajung

Laminex 300T

WA Pres 1000T

Simcoa 1000T

Total 3 Piles

SOFT WOOD & NATIVE FOREST

Pre Start | Travel Empty | Load Bay 1,2,3,4 | Auto Strap | Drive To Forest Exit | Safety check | Drive to customer

SOFT WOOD

Slot | Stop - Go | Weigh Truck (stop go) | Wait & Move | Unload | Wait for Driver | Drive Forward | Auto Blower Sweep Off | Safety Check | Weighout (Tare)

NATIVE FOREST

Integrated Timber Processing Yard

ITPY

Softwood

10	62	0	12	8	10	5	83	180	37 mins	No Delay Cycle Time
10	62	0	12	8	10	5	83	192	51 mins	Lead Time inc Delays / Waiting

Native

0	0	0	12	0	0	0	0	12	29 mins	No Delay Cycle Time
0	0	0	12	0	0	0	0	24	31 mins	Lead Time inc Delays / Waiting

Weigh Truck (stop go) | Unload | Drive Forward | Auto Blower Sweep Off | Safety Check | Weighout (Tare) | Back Load % Trucks | Supermarket

Auto Blower

6	6	8	1	3	3	5	5		37 mins	No Delay Cycle Time
6	6	12	8	1	3	1	3	1	5	5		51 mins	Lead Time inc Delays / Waiting

Port

QUICK TURN AROUND BINS

AUTO TARP

Pre Start | Travel Empty | Announce Arrival @ Coupe | Travel & Turn Around | Complete D Note & Admin | Load Lead Trailer | Load Rear Trailer | Move to settle load | Check & Tarp load | Drive | Onroad Delays

10	0	0	10	5	15	15	10	1	130	10	206	
10	0	0	10	5	30	15	15	10	1	130	10	236	

6	6	6	1	3	3	5	5		29 mins	No Delay Cycle Time
6	0	6	1	3	1	3	1	5	5		31 mins	Lead Time inc Delays / Waiting

2nd grid

6	30	1	3	3	5	5		53 mins	No Delay Cycle Time
6	7	30	1	3	1	3	1	5	5		62 mins	Lead Time inc Delays / Waiting

Softwood Sector

Annual Volume	1,000,000
Business Days	230
tpd	4,348
tphr	21,739

Average Payload (tonnes)

Tons/Day	42	43	44	45	46	47	48	49	50
1.2	87	85	83	81	79	78	76	74	73
1.3	80	78	77	75	73	72	70	69	67
1.4	74	73	71	70	68	67	65	64	63
1.5	70	68	66	65	64	62	61	60	58
1.6	65	64	62	61	60	58	57	56	55
1.7	61	60	59	57	56	55	54	53	52
1.8	58	57	55	54	53	52	51	50	49
1.9	55	54	53	51	50	49	48	47	46
2.0	52	51	50	49	48	47	46	45	44
2.1	50	49	48	47	46	45	44	43	42
2.2	48	46	45	44	43	43	42	41	40
2.3	46	44	43	43	42	41	40	39	38
2.4	44	43	42	41	40	39	38	37	37
2.5	42	41	40	39	38	38	37	36	35
2.6	40	39	39	38	37	36	35	35	34
2.7	39	38	37	36	36	35	34	33	33
2.8	37	37	36	35	34	34	33	32	32
2.9	36	35	35	34	33	33	32	31	30
3.0	35	34	33	33	32	31	31	30	29

Native Forest Sector

Annual Volume	500,000
Business Days	230
tpd	2,609
tphr	13,043

Average Payload (tonnes)

Tons/Day	42	43	44	45	46	47	48	49	50
1.2	52	51	50	49	48	47	46	45	44
1.3	48	47	46	45	44	43	42	41	41
1.4	45	44	43	42	41	40	39	39	38
1.5	42	41	40	39	38	38	37	36	35
1.6	39	38	38	37	36	35	34	34	33
1.7	37	36	35	35	34	33	33	32	31
1.8	35	34	33	33	32	31	31	30	29
1.9	33	32	32	31	30	30	29	29	28
2.0	32	31	30	29	29	28	28	27	27
2.1	30	29	29	28	28	27	26	26	25
2.2	29	28	27	27	26	25	25	25	24
2.3	28	27	26	26	25	25	24	24	23
2.4	26	26	25	25	24	24	23	23	22
2.5	25	25	24	24	23	23	22	22	21
2.6	24	24	23	23	22	22	21	21	21
2.7	24	23	22	22	22	21	21	20	20
2.8	23	22	22	21	21	20	20	20	19
2.9	22	21	21	20	20	19	19	18	18
3.0	21	21	20	20	19	19	19	18	18

In-Forest Chip (Hardwood) Sector

Annual Volume	1,000,000
Business Days	230
tpd	4,348
tphr	23,730

Average Payload (tonnes)

Tons/Day	48	49	50	51	52	53	54	55	56
1.2	76	74	73	72	70	69	68	66	65
1.3	70	69	67	66	65	64	62	61	60
1.4	65	64	63	61	60	59	58	57	55
1.5	61	60	58	57	56	55	54	53	52
1.6	57	56	55	54	53	52	51	50	49
1.7	54	53	52	51	50	49	48	47	46
1.8	51	50	49	48	47	46	45	44	44
1.9	48	47	46	45	45	44	43	42	41
2.0	46	45	44	43	43	42	41	40	39
2.1	44	43	42	41	40	40	39	38	37
2.2	42	41	40	39	39	38	37	36	35
2.3	40	39	38	38	37	36	36	35	34
2.4	38	37	37	36	35	35	34	33	33
2.5	37	36	35	35	34	33	33	32	32
2.6	35	35	34	33	33	32	31	31	30
2.7	34	33	33	32	31	31	30	30	29
2.8	33	32	32	31	30	30	29	29	28
2.9	32	31	30	30	29	29	28	28	27
3.0	31	30	29	29	28	28	27	27	26

TOTAL EXCELLENCE MANUFACTURING

TXM Lean Solutions Pty Ltd
ABN 447 885 800 54

211/134 Cambridge Street
Collingwood VIC 3066 Australia

P +61 3 9607 8241
F +61 3 9419 2572

info@txm.com.au
www.txm.com.au