

Theme: Harvesting

Task No: 3.2

Report No. : H014

High Performance Work Systems for the Logging Industry

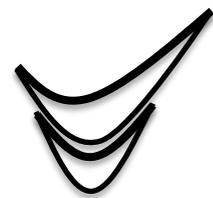
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Date: 20 February 2014



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EXECUTIVE SUMMARY

In 2012, the Ministry of Business, Innovation and Employment supported a pilot project for Future Forests Research Limited (FFR) to introduce High Performance Work (HPW) systems to logging contracting firms. The HPW initiative was a government initiative to promote wider implementation of high performance work among New Zealand business enterprises, in order to secure higher productivity through effective employee engagement and improved workplace practices.

HPW is “an organisational system that continually aligns its strategy, goals, objectives, and internal operations with the demands of its external environment to maximise organisational performance”. It works on the premise that employees become self-managing, highly involved and empowered to make decisions and improvements to their work with little involvement from managerial staff.

Seven key elements were identified that a firm must have to be deemed high performing:

1. Leadership from crew managers
2. Good working culture in the crew
3. Clearly defined work processes
4. Crew is innovative and will try new ideas
5. An extensive training programme and performance payment is in place
6. Crew will collaborate with other crews to help improvement
7. Extensive sharing of financial and performance information with all employees.

A pilot project was undertaken from January 2012 whereby six logging contracting firms were introduced to HPW systems by way of workshops, and improvement plans were developed to help those firms to improve production and safety. The project demonstrated that the six logging contractors showed good skills in leadership, developing a good working culture and defining work processes. The process of developing ideas for improvement during the workshops clearly showed employees had developed innovative thinking. The inability to separate losses from normal practice limited the introduction of improvements. Business improvements were not undertaken systematically. In general, training plans were in place but weren't extensive and there was a limited amount of collaborative sharing of information. Generally good production records were being kept and employees were well aware of short term targets. Only one crew had a business plan in place. Extensive sharing of financial performance was not evident and this factor was unlikely to change.

A key element of HPW is self-managed and empowered employees and it was deemed that this element is unlikely to evolve within the logging industry given the necessity for contractors to manage the health and safety of their operations closely in a very controlled way.

It was concluded that many elements of HPW would benefit the logging industry, but a widespread move to HPW systems as described was unlikely. Application of extensive training, business planning and systems to generate ideas for improvement would benefit both the individual logging contracting firms and the industry at large.

BACKGROUND

Productivity is a measure of efficiency of the use of inputs such as labour, capital, land and energy to outputs of goods and services. Nationally, productivity therefore can be measured as GDP per capita. In the macroeconomic sense, improving New Zealand's productivity relative to its trading competitors can help improve its trade competitiveness and ultimately the trade balance of payments. The importance of increasing productivity is that it is one of the major ways to improve the nation's long-term material standard of living.

Statistics New Zealand has been capturing productivity related statistics since 1978 and comparing New Zealand's productivity to the 34 participating countries of the OECD, the Organisation of Economic Cooperation and Development (Statistics NZ, 2014). While New Zealand's GDP per capita has grown at a faster rate than the average OECD participants, the labour productivity levels are lower than the OECD average. Agriculture and forestry labour productivity performs better than the manufacturing industry.

In 2004 the Government began to investigate and implement strategies to identify key issues affecting New Zealand's workplace productivity. As part of its drive to lift New Zealand's labour productivity, the Government launched a workplace initiative to provide practical support to firms wanting to introduce HPW practices. Its goal is to promote wider implementation of high performance working among NZ enterprises, in order to secure higher productivity through effective employee engagement and improved workplace practices.

In HPW systems people are seen as a source of competitive advantage, rather than a cost to be minimised. HPW was seen as the most applicable system, as its focus is on stimulating more effective employee involvement and commitment to achieve high levels of performance. Other management philosophies (Appendix 1) tend to focus more on process improvement rather than people motivation and empowerment.

The key features of HPW systems are;

1. combining enhanced workplace culture, relationships and communications, with better workplace practices designed to raise productivity;
2. a high level of employee engagement, to secure staff buy-in and contribution;
3. business improvements are undertaken systematically, not in an ad-hoc fashion; and
4. the processes of HPW become embedded within the organisation as part of its normal activities.

A company practising a HPW system in its purist form would be structured so that employees at all levels are responsible for improving work methods and procedures, solving problems on the job, and coordinating their work with that of others. In HPW, employees are to a large degree self-managing and rely on leaders only to develop a clear vision, mission, and goals. High performing employees work as though they are the owner of the company and not simply employees of it. As such, employees should feel more responsible for the company's success and therefore want to do more to contribute to that success.

Earlier work by the Department of Labour (DOL, 2011) identified seven key elements that can improve a company's productivity, and if practiced, the company would be deemed to be a high performing organisation. These seven drivers of workplace productivity were defined as:

1. **Building leadership and management capability**
Effective leadership is about having a clear vision of where the business is heading. It's about identifying new opportunities and inspiring the team to pursue those opportunities. Leadership is required from individuals and from teams.

2. **Creating productive workplace cultures**
Positive relationships between staff, teams and managers are a feature of productive workplaces. A positive work environment is created where people's insights and experience are valued, their ideas help to do things smarter and better, people are motivated and committed to the organisation.
3. **Work organisation.**
Productive workplaces have defined work processes that enable them to adapt and grow as products, technology and markets change. A well-organised workplace is able to get the best out its staff and technology.
4. **Encouraging innovation and the use of technology**
Productive workplaces are innovative in the way they use technology, and plan and organise themselves. Innovative people will try new ideas; and they generally are more highly skilled and highly paid.
5. **Investing in people and skills**
The more skills people have, the more capable they will be with new technology, and they can work more quickly with fewer mistakes. They generally require less supervision, accept more responsibility and are better communicators. Extensive training and performance payment leads to higher skills and wages and lower staff turnover.
6. **Networking and collaboration**
Workplace productivity can be improved by exchanging ideas and information with other firms in the same industry. Collaborating with others can reduce the cost of doing business and give quick access to new ideas and new technologies.
7. **Measuring what matters**
Extensive sharing of financial and performance information of the company with all employees helps everyone to understand the things that make the biggest difference in improving workplace productivity.

LITERATURE REVIEW

There are many publications on high performance work systems, most of which are American-based. Traditionally, the USA operated under an industrial labour relations-driven system, governed by the National Labour Relations Act. This Act implemented the national labour policy of assuring free choice and encouraging collective bargaining as a means of maintaining industrial peace. After WWII, Japan, with help from America, was rebuilding industry and using human resource scholars from America to put in place human resource systems that were not heavily unionised but were at the same time highly productive.

Watching these developments in Japan, American industry out of necessity began adopting new human resource systems to try and simplify and improve employee management relationships. In the late 1970s, America began introducing these new human resource practices, one of which was “High Performance Work Systems” (HPWS). Much of the research and literature on HPWS showed improvements in productivity compared to the more highly unionised systems.

There is no general accepted definition for HPWS (Kirkman *et al.* 1999), and therefore it is difficult to say whether an organisation is practising high performance processes or not. Despite the discrepancy among researchers and authors on what constitutes high performance work, after an extensive literature review, Kirkman *et al.* (1999) defined high performance work as:

“An organisational system that continually aligns its strategy, goals, objectives, and internal operations with the demands of its external environment to maximise organisational performance”.

Kirkman *et al.* (1999) summarised the components of HPWS as: self-managing work teams; employee involvement; participation and empowerment; total quality management; integrated production technologies; and a learning organisation. A common understanding throughout the literature is that the importance of the components is not equal, but that each component is used to varying degrees in the organisation. Other research suggests that defining vision, mission, business strategies and goals are critical steps to achieving high performance (Gephardt and van Buren, 1996).

Overall, the existing evidence on the impact of HPW practices on the financial and non-financial performance of organisations has been positive (Becker and Huselid, 1998). Pfeffer (1998) defined seven practices that characterise successful organisations as: (1) employment security; (2) selective hiring of personnel by assessing fit; (3) self-managed teams and decentralised decision-making; (4) relatively high compensation linked to organisational performance; (5) extensive training; (6) reduction in status distinctions and barriers; and (7) extensive sharing of financial and performance information.

Of all companies that have been introduced to HPWS, the majority used some of the components and only a minority changed over completely. Some researchers found that introducing HPWS practices piecemeal is unlikely to be productive, and in some circumstances may be counterproductive (Pfeffer, 1998).

Lower turnover is sometimes claimed as one of the major benefits of HPWS. HPW in its purest form, where there is an increase in workers’ involvement, participation and control, can result in the need for more effort from the workers which can result in increased work pressure and strain (work intensification) which can potentially lead to higher turnover (Hegan, 2006).

After researching employees’ responses to HPWS, Hegan (2006) concluded that they fulfil their basic premise of increasing performance, but the effectiveness of HPWS is diminished through a lack of employee commitment and continuance which can be directly related to the negative impact of demanding more effort from employees. The challenge remains to engage the participation of employees in HPWS without the negative effects.

INTRODUCTION

The volume harvested from New Zealand plantation forests has increased from 18.8 million cubic metres in the year to March 2009 to 28.0 million cubic metres in the year to March 2013 (MPI, 2014). This volume was harvested by around 430 independent logging contracting firms employing 3900 employees. Over the next ten years (to 2025) the sustainable forest harvest has the potential to increase to 35 million cubic metres. This increase will require one new logging contracting firm on average every four weeks, assuming no improvements in efficiency.

If the trend of the last 10 years continues, logging costs will continue to increase at a faster rate than the market price for logs, resulting in lower profitability for the forest sector. If future logging costs cannot be reduced, harvesting some forests will become unprofitable, which will have a major impact on the expansion of the forest and wood processing industries.

To maintain or reduce logging costs, growth in productivity is required by logging contracting firms, particularly for the harvesting of steep forests, where productivity is lower and costs higher than forests on flat terrain. The role of logging contractors and their employees in this productivity improvement process is hugely important. Traditionally, the logging contractor firm comprises between 8 and 13 employees per logging crew (Visser, 2013) with the logging contractor-employer as a key working member of the crew. The logging contractor often does not have the time to work on business improvement. The employee at the “felling face” of logging not only has many ideas for improvement, but will also be the single biggest factor in the successful implementation of those ideas.

In 2011 Future Forests Research Limited (FFR) recognised that the forest industry was slow to implement R&D especially in the areas of productivity and safety. This was due to a number of industry constraints (resources, management, skills, profitability, benefit sharing mechanisms, trust etc.). The solution was seen to be a mix of business management, people management, work organisation, health and safety and R&D implementation. The pathway to the solution was engaging harvesting “experts” in one-to-one field-based mentoring of logging contracting firms to generate and implement improvement initiatives. A key element of this initiative was to challenge the contractor to develop processes for continuous improvement.

In 2012, the Partnership Resource Centre of the Department of Labour (now Ministry of Business, Innovation and Employment) supported a pilot project for FFR to introduce High Performance Work Systems (HPWS) to logging contracting firms.

It was seen that the economic gains from a High Performance Work initiative could be substantial and would demonstrate the value of the current FFR Primary Growth Partnership (PGP) harvesting research programme. The initiative would develop the partnering concept between forest management companies (who co-fund the PGP harvesting programme) and their logging contracting firms to work together for gains to both parties and share the benefits.

The vision was that this HPW initiative would develop a work environment where contractors and their workers create the opportunity to be more profitable by generating improvement initiatives using HPW processes and implement these to improve business performance.

This initiative involved a small pilot project for introducing HPW systems to six logging contractor firms to help them develop a culture of improvement. This report summarises what was done, and investigates the usefulness of HPW systems for logging contractors as a way of improving productivity and profitability. It was seen that this pilot project would be rolled out to other forest managers and contractors in FFR. Publishing this Technical Report is a further step in the wider implementation of HPW processes in the logging industry.

OBJECTIVES

The objectives of this pilot project were to introduce logging contractors and their employees in the processes of HPWS and specifically to:

1. Plan for the implementation of ideas for improving productivity, profitability and safety of their logging businesses, and how a portion of those benefits might be shared with the forest management companies.
2. Demonstrate to the logging industry the benefits of HPW processes, and to further support the logging industry in the uptake of HPW processes on the completion of this pilot project.

It was essential for the success of this pilot project to develop and foster conditions necessary for HPWS within individual logging contractor firms. These success measures included the ability to:

1. Exhibit effective team leadership.
2. Clarify roles for each team member.
3. Operate in a productive and safe manner as a team.
4. Enhance communication among members of the team.
5. Develop goals and plans as a team (both contractor and employees).
6. Measure continuous improvement as a team.
7. Solve problems and make decisions on a timely basis as a team.
8. Facilitate productive team meetings, discussions and workshops.

METHOD

Step One – Contractor Selection

In February 2012, three forest management companies expressed a willingness to participate and encourage six logging contractors (two from each forestry company) to work with and develop processes required to achieve high performance work teams. The participating companies were;

1. PF Olsen Ltd.
2. Rayonier NZ Limited.
3. Ernslaw One Limited.

The criteria for contractor selection for the pilot project were that each logging contractor had:

- Been a logging contractor for a minimum of three years and not longer than 10 years
- Aspirations to do better both in productivity and also general performance as measured by the forest company
- Demonstrated past improvement initiatives
- A stable team with low turnover to allow HPW processes to be sustainable
- Demonstrated a willingness to work with the forest company rather than simply for the forest company
- Achieved financial security
- Well maintained and productive equipment.
- A reasonably good understanding of logging business requirements.
- Achieved a ranking as a medium performer as measured by the forest company

Step Two – Crew Baseline Survey

A baseline questionnaire was completed by all participants (employees and contractor). A slightly different questionnaire was completed by the crew foreman/contractor. The survey asked questions around the seven drivers of productivity (Appendix 2), and responses formed a reference of where the crew were positioned in respect to HPW systems.

Step Three – Contractor Productivity Assessment

A one-day time study of each crew was undertaken. The data from each crew were analysed to gain an understanding of how the crew worked and whether there were production losses occurring or changes that could be made to help improve production.

Step Four – Contracting Crew Workshop

A one-day workshop was held with each crew (Appendix 3). The objectives of the workshop were to:

- familiarise each crew with HPWS processes;
- discuss how the crew was performing currently;
- discuss any improvements that could be made;
- begin the process of strategic planning by developing vision and mission statements and goals with assigned accountabilities and completion dates; and
- agree how the achievement of each goal might be measured.

As an introduction a summary of what a high performance logging team might look like was presented.

1. Leadership is provided by the contractor or crew manager. There is a Vision, Mission and Goals in place that each employee can understand and towards which they can contribute. Employees could become more self-managing through better understanding of where their boss was heading and what he was trying to achieve.
 - 1.1. This is a documented plan that involves everyone and is reviewed constantly.
 - 1.2. It is possible to change the plan, the changes to be documented.
2. A good working culture is present within the crew where employees are viewed as a source of competitive advantage:
 - 2.1. Each person in the crew is critically important and their role is not minimised. Logging is a chain of tasks and production is dictated by the slowest link.
 - 2.2. The manager of a high performance team should have a waiting list of potential employees wanting to join, and therefore has more opportunity to employ good people which in turn helps productivity and ensures the whole team is achieving its goals.
 - 2.3. The Boss reacts quickly to untenable situations.
 - 2.4. Everyone in the crew treats everyone else with respect.
3. Work processes are clearly defined and each employee has a job description.
4. There is a process for capturing new ideas for improvement:
 - 4.1. The ideas are analysed and potentially good ideas tested
 - 4.2. Each team member is happy to be critiqued
5. Training is extensive:
 - 5.1. Training is a key component of High Performance Work and ensures continuous improvement
 - 5.2. Weaker links in the chain are trained and brought up to speed quickly
6. Crew will visit other operations, field days and demonstrations to help improvement.
7. There is extensive knowledge shared with the crew about crew performance including financial performance:
 - 7.1. Remuneration is closely linked with crew financial performance
 - 7.2. Reward for effort ensures employees always looking for improvements
 - 7.3. Reward systems require careful design so as not to be a disincentive

A summary of the one-day time study analysis was provided as a basis for discussion on the way the crew worked, and worked in together to achieve the target. The summary kick-started excellent discussion as to why and how logging tasks were performed and the many choices and decisions the crew had to make throughout the day.

A strategic planning process was introduced to each crew and discussions started with their view of the future. In all cases the crew became very aware that rising logging costs might not be sustainable. In all cases labour and diesel were seen as high risk cost items that were difficult to manage. Out of this discussion came a vision statement. Then looking at themselves the crew discussed their weakness and strengths, threats and opportunities. This led to discussions on how they wanted to portray themselves and be viewed by the Forest Management Company and peers leading to development of the mission statement.

Benchmark statistics in terms of Key Performance Indicators and Measures were recorded about the current operation (Appendix 4). After much discussion and agreement new targets were then developed based on what the crew thought they could achieve (Appendix 5). Where the Forest Management Company had implemented a contractor evaluation system, setting new targets was much easier for the crew. The action plan came next and this took most of the workshop: how was the crew going to do things differently (better, faster, smarter) to achieve the new targets they had agreed? Many ideas, some of them new, on how they were going to achieve each target were discussed at length and agreed, and then responsibilities for achieving them were recorded.

Step Five – Business Plan Development

The outcome of the workshop was a Business Plan document for the crew which included all the ideas that were going to be put in place or tried. An example business plan is included as Appendix 6. Some of the ideas needed capital investment, and in all cases a Net Present Value was calculated to check on which ideas would be best to pursue and what the internal rate of return the crew could expect from their investment.

Step Six – Trials of Improvement Initiatives

Over the course of the project, six trials were planned to investigate a selection of improvement initiatives:

1. Better directional felling to help improve breaker-out performance.
2. Better data collection of productivity performance especially delay time.
3. Improve the safety culture in the crew.
4. Introduction of a camera to monitor the breaker-outs and display on a screen inside the hauler cab so the hauler operator can see the break-out and in-haul phase.
5. Purchase a second hauler pole to reduce delays and increase the number of work days available.
6. Install lights on grapples to allow extended shifts.

Step Seven – Meeting with Forest Management Companies

Meetings were held with the three forest management companies to discuss contractor improvement initiatives. Some of those meetings included the contractor and some were with the consultant only, but in all cases the meeting plan was the same. The main outcome of these forest management company meetings was that the next steps for implementation were agreed.

Step Eight – Continuation with Logging Contracting Firms

The consultant offered free of charge on-going assistance for the participant contractors to help with annual plans and idea development and analysis of those ideas. Three of the six participating logging contractors showed a willingness to carry on with the process of developing plans with a subset of their crew as an annual update.

RESULTS

Contractor Selection

On the basis of the criteria for contractor selection the following logging contracting firms (in no particular order) were selected to participate in this pilot project:

- A. Tairua Logging Limited.
- B. Everitt Davis Logging Limited.
- C. Stubbs Contractors Limited.
- D. RAD Logging Limited.
- E. Gibbs Olsen Logging Limited.
- F. BALCO Logging Limited.

The six crews selected varied from high performing crews to lower performing crews. The selection criteria outlined above were not met by all crews in entirety, but in all cases the crews were highly involved in the process. Two of the crews were in the bottom 10% of the company's contractor evaluation, one crew was in financial difficulty; one crew was operating very close to what would be expected of a High Performance Work team, the remaining two were good medium performers.

Baseline Survey

1. Crew One had never heard of "high performance work". The contractor showed good leadership but did not have a business plan in place. Creating a good place to work was important to him. The contractor involved the workers in the operational plan and targets were well known and any ideas for improvement were well received. Both the contractor and employees agreed there was some training being done. The employees of this crew stated they worked as a team but each team member didn't necessarily make it easier for the next person in the chain. Good production records were being kept, but there was no production meeting held.
2. Crew Two had never heard of "high performance work". The contractor showed good leadership but did not have a business plan in place. The contractor made some effort in creating a good place to work. Ideas for improvement were taken on board and the employees could voice their opinion about operational plans. Training plans were in place and both the employee and contractor agreed some training was being done. This crew stated they worked as a team and tried to make it easier for the next person in the chain. Good production records were in place.
3. Crew Three had never heard of "high performance work". The contractor showed good leadership but there was no business plan in place. The crew had a good team spirit and the contractor made a reasonable effort to create a good place to work and had a process in place to encourage employees to improve what they were doing. As such all employees agreed that they had a productive work culture. Crew members varied in responses to the "amount of training that was received" from a lot to a little, but each crew member had a training plan in place that covered more than their current task. The crew agreed that they worked together as a team but also agreed they could make things easier for the next person in the chain. This crew met weekly to discuss production and the crew knew exactly what was the forest company view of their performance.

4. Crew Four had never heard of “high performance work”. The contractor showed great leadership and all employees agreed it was a very good place to work. There was no business plan in place. Targets were set and any ideas for improvement were well received. There was an ad hoc system in place for rewarding good performance. In the contractor’s opinion there was a lot of training done which differed from the employees’ views who thought only a little training was done. This crew thought they worked as a team but didn’t always make it easier for the next person in the chain. Reasonably good production records were kept, but there was no specific production meeting held.
5. Crew Five had never heard of “high performance work”. The contractor showed great leadership and clearly all the employees enjoyed being part of this crew. The contractor had been through formal training in management and had a business plan in place. This came through in how he ran the morning planning meeting where the day’s plan and targets were discussed. Each employee was invited to suggest improvements during the morning meeting. Ideas that were being tried elsewhere in the logging industry were also discussed. The employees thought that some training was carried out. The crew agreed that they worked as a team and there was focus on making the job of the next person in the chain easier. Good production records were kept.
6. Crew Six had never heard of “high performance work”. The contractor displayed average leadership and generally the employees were happy with their place of work. There was no business plan in place. The employees agreed that the contractor involved them in improving work but there was no reward if the employees did so. The employees didn’t keep up to date with new technology and ideas for improvement, but all employees stated that they were very much included in trying to improve. The employees and the contractor agreed that some training was done but there was no individual training programme in place and training was based on the greatest need at the time. The employees all agreed that they worked as a team and did try and make it easier for the next person in the chain. Each employee had a job description. The employees also stated that they knew the targets and knew how the forest company viewed their performance.

Productivity Assessment

A one-day study of each crew showed there were losses occurring at each crew. The losses in general were not recognised as they were considered “normal” logging practice. Because the losses were considered normal no one was trying to reduce these occurrences. Some examples of these are highlighted below.

1. Crew One’s operation was using the “scab skyline” configuration over a maximum distance of 450 m. On many occasions while watching this operation the drag would hit and get stuck on a stump not far from the landing where deflection was critical. The operation would stop and the drag reversed and then lifted before inhaul could start again, putting extra stress on the hauler operator. On entering the landing chute the butts occasionally became tangled in the heads of the trees that were already in the chute, again causing the inhaul operation to stop before the drag was lifted clear to continue inhaul. Due to the scab system chosen the tail rope was slackened to lower the drag to the ground. The tail rope took a minute to wind up each cycle before outhaul could begin. Winding up tail rope took an hour per day in total. Even so the operation achieved good volume for the day.
2. Crew Two’s operation had difficulty landing and holding the trees at the landing while working the North Bend system. The operation was fully mechanised, using electronic chokers and as such operated with no pole man. Two issues were occurring when trying to land the trees. The first was one electronic choker wasn’t releasing well which meant the

hauler driver had to get out of the hauler and manually release the problem choker, taking valuable time. The second issue was the tree on the back strop wanted to slide off down the hill which meant the releasing of chokers was taking longer than it should have due to no slack. It was interesting to note that the processor operator would sit idle and watch the problem without any effort to help. There seemed to be no one trying to fix the issue either. Even with these operational interferences this crew still pulled good production on the day but did report they were behind target for the block.

3. Crew Three's operation also had problems landing the trees effectively while operating North Bend skyline. They were managing the situation with an excavator coming to the chute and holding the trees before the chokers could be released. Often there was a delay while waiting for the excavator to stop what it was doing and walk to the chute. Despite this interference this crew also pulled good volumes for the day.
4. Crew Four's operation was delayed during the day due to a tree left standing by the faller. The faller had left the tree due to the amount of debris around it at the time of felling. By the time a saw had been sent down the rigging and the tree felled an hour of extraction time was wasted and later discussions were around whether that single tree could have been dealt with better. The breaker-outs also got into an area where the trees had been felled across each other, and dealing with this area halved the production rate. It clearly demonstrated how poor felling affected cable yarding productivity.
5. Crew Five's operation was a standard grapple operation, and very productive. The communication between the hauler driver and spotter was taking a little bit of time but no more than normally expected. This grapple operations demonstrated how a few seconds are very important, with just 5 seconds comprising 4%-5% of the hauler cycle time.
6. Crew Six's operation was not being managed well, no targets, very little monitoring, poor decision making, deflection issues and no drive to perform better. The cable extraction crew was mostly self-managed in a way that might reflect high performance work, but the extraction crew lacked in skill and motivation.

On the completion of the six days of time study it was evident how time study information can help identify waste that may otherwise not be recognised. In most cases the crews were surprised by how much lost time was impacting on production and how much more productive they could be by minimising waste or intervening early to ensure issues were dealt with.

Far too often losses (delays) and interferences are accepted as standard practice in logging, and this was demonstrated in all crews visited. Well-known North American logging systems consultant, Mr Brian Tuor, who was part of this High Performance Work pilot project, openly stated that as an industry what we need to do is train our people better and limit our mistakes, and that alone would take care of our future.

Crew Workshops

Business planning is essential and helps contractors to focus on what is happening currently, but also allows careful scrutiny of what may happen in the future and how that view of the future might change what contractors need to do now. Business planning processes may help to foresee these possible changes and in doing so be ready for their eventuality.

The business planning process was very beneficial, and all crews were fully engaged and very interactive right from their view of the future, their weaknesses and strengths their vision for the future and target setting. In all cases the contractors had a pretty clear picture of where they were heading but the crews themselves were generally unaware of what the boss had in mind and how that may benefit them as individuals.

As part of the business planning process, the formulation of ideas of how the crew might reach future targets was outstanding and all crew members, with no exceptions, were fully engaged in the conversations around ideas for improving what they did. Interestingly some of the ideas that came out were similar to projects already in the FFR harvesting research programme.

At the end of the business planning process it was clear that the contractors' employees should be given a chance to put their ideas forward to help improve the industry's productivity.

Business Plans

Crew One

Crew One's high level goals were to:

1. increase production volume per year from 60,000 to 70,000 tonnes;
2. have a productivity incentive payment system in place and working; and
3. build a good safety culture within the crew.

This crew achieved their production goal. During the year they introduced a Satco processor, repowered their hauler and started a seven-day-a-week operation. The crew targeted two trials to complete, one with an Alpine grapple with lights for night harvesting, and a second with the cutover camera to give the hauler operator better vision of breaker-outs in difficult terrain. This crew was losing twenty days per year shifting their hauler (which was difficult to shift), and they generated an idea of having a second hauler pole to pre-rig in their next setting in advance. The analysis showed this was a good idea to pursue. They found a pole suitable, which in the end they decided not to purchase in favour of other equipment purchases. From a safety perspective they continue to work on their safety culture. One of the crew had a felling accident earlier in the year which set the crew back a little. This crew wants to continue with the business planning process.

Crew Two

Crew Two's high level goals were to:

1. improve productivity from 52,000 tonne per year to 56,000 tonne per year; and
2. develop a good safety culture within the crew.

Production-wise the crew struggled through the first half the year and had a much better second half of the year. Overall they had a better result than the previous year. One of the ideas that were discussed during the workshop was the introduction of a grapple to log the front face below the landing. This area was recognised as high risk for breaker-outs. At the time of the workshop this crew was struggling financially and didn't want to spend money on another carriage but were interested in a grapple they could lower from their ACME carriage. During the year this crew introduced a Falcon Claw grapple carriage to help improve safety in the operation which worked well in the right conditions.

Crew Three

Crew Three's high level goals were to:

1. improve productivity from 58,000 tonne per year to 65,000 tonne per year;
2. Put in place a breaker-out incentive payment system; and
3. develop a good safety culture within the crew.

This crew went from the bottom five crews out of 25 in the forest company's crew ranking system to 13th and narrowly missed their aim of a top 10 placement. Production-wise this crew had a much better year, which was attributable to better work performance and the purchase of a Boman

motorised carriage which has been a good success for this crew. The breaker-outs are now incentivised to perform well. It was this crew's idea to reward accident-saving reports.

Crew Four

Crew Four's high level goals were to:

1. improve productivity from 55,000 tonne per year to 60,000 tonne per year; and
2. put a productivity incentive payment system in place and make it work.

This crew produced 90,000 tonne for the year, over-achieving their goal of 60,000 tonnes. At the time of the business planning session this contractor was in financial difficulty and three months behind with payments to creditors. As such any ideas that needed capital were going to be difficult to achieve. The crew terminated their contract with the forestry company to pursue another business venture but decided to continue with the HPW programme. Within the year this operation went from financial difficulty to good cash flow surpluses. Even though the improvement ideas did not originally include the purchase of a drop line carriage the contractor purchased one during the year and performance improved. This crew did put in place good production record keeping. An incentive payment scheme was also put in place.

Crew Five

Crew Five's high level goals were to:

1. improve productivity from 60,000 tonne per year to 65,000 tonne per year; and
2. develop a good safety culture within the crew.

This crew had a management system in place very similar to how HPWS might be expected to operate in a logging crew. Each morning this crew met to discuss the day's plan which included health and safety as one item on the agenda. The contractor asked for ideas to do things better before closing the meeting. This crew was part of a larger contracting business and were well supported by the principal contractor. This crew used a grapple and it was clear that bunching would have helped as well as use of a grapple camera. During the year a camera system was purchased and trialled in one of the principal's other crews. The contractor and principal contractor discussed the pros and cons of bunching machines, but as of the completion of the pilot project had not made a purchase decision as they were still unsure of the benefits. This crew was relatively new to contracting and as such were very careful about implementing change but were very open minded.

Crew Six

Crew Six's high level goals were to:

1. improve productivity from 36,000 tonne per year to 50,000 tonne per year;
2. put a productivity incentive payment system in place and working; and
3. increase the level of training for the hauler team.

This crew did not achieve their production target with one hauler. The introduction of another hauler increased production, and with two haulers operating for most of the year met their target volume. One of the bigger issues for this crew was availability of staff, and as a result was running only one breaker-out per hauler operation. This crew were in the bottom five of 25 crews in the forest management company's crew ranking system, and operating below the minimum standard. At the start of the project and for their cable operation there were no targets set, no monitoring of production, no way to know what the haulers produced, limited training and a lack of skills and staff tenure issues. Their goal was to be in the top 10 by December, 2013. Soon after starting this crew had targets in place, hauler tally sheets in place, including accurate records of downtime, and generally more focus on production. Logging systems consultant Mr Brian Tuor was invited to do some specific training around maximising payload for the hauler operation. The crew went to visit

other high production cable operations to generate more ideas on how to increase production. The crew trialled a grapple carriage (with the view of minimising the impact of absenteeism on the hauler operations) but did not like the concept and instead purchased a Howe line motorised slack pulling carriage to use in uphill settings with good deflection. The crew started bunching wood wherever they could to improve cycle time and payload. Even though this crew was not high producing yet there was a noticeable change in this crew during the project. Overall safety of the hauler operation was improved. By mid-year they had raised their ranking to 14th out of 25 crews but by year end had slipped back to 19th, though still above the minimum performance requirement.

At the start of the project this crew was in financial deficit and by the end of 2013 were back in surplus. This is one of the crews that wanted to carry on with the business planning process and idea development. During the project they put in place incentive payments and rewarded good performance.

Achievement of HPW Processes

Leadership

All six crews showed some aspects of high performance work. In all cases the contractors showed good leadership and tried to develop a good place to work. Only one contractor had a written business plan and he was very clear about where he wanted to be and shared his aspirations for growth. The other five crews knew their plan for the year and what they needed to do to achieve it in terms of production and finances. The relationship the contractors had with their staff ranged from good to very good and all employees enjoyed their work. On a day to day basis the employees knew the plan for the day in five of the crews. The sixth crew started discussing the days plan with the appropriate employees soon after the start of the project.

Workplace culture

In all cases both employees and contractors thought they had a pretty good work culture, and that everyone in their respective crews was working as a team. However in all cases all employees thought they could make more effort in making the next person's job easier. This was reinforced in the one-day time studies where all but one crew showed instances where things were made more difficult than they needed to be for the next person in the chain.

Clearly defined work processes

In all cases work processes were clearly defined. Most employees had job descriptions, and in most cases were employed to do a specific task. In some instances these organisational boundaries worked against teamwork and productivity.

Innovation and ideas for improvement

Regarding developing ideas for improvement, all employees agreed that their boss would listen to ideas for improvement, but only one contractor had a process in place which was formalised. During the workshops each crew came up with many ideas to improve. Some of these ideas were relatively simple to put in place. Some ideas were difficult and needed development, some ideas required a reasonable amount of capital and some ideas were already part of the FFR Harvesting Research Programme.

People and skills

A key element of high performance work systems is there is extensive training in place. Employees thought there was some training done for the role they were in, and only one crew carried out training for employees for other roles. In the contractors' views the amount of training given was higher than that in the employees' views. Only one contractor thought the cost of training was included in the logging rates.

In one case, logging systems consultant Mr Brian Tuor was employed as part of the project to give the crew some tuition in cable mechanics, to help the logging crew understand the relationship between rope tensions and payload. The crew's understanding of tension and payload at the beginning of the workshop was poor. The employees were surprisingly very engaged and asked a lot of questions. Methods for determining tension were provided, but these methods were time consuming. Without some form of continuous monitoring of tension in working ropes (such as using electronic tension monitors), logging crews are running blind in terms of allowable payload. One general observation arising from the pilot project was that extensive training was lacking.

Performance Payment

Three crews were paying incentives for additional production and their systems were working to keep employees motivated. The other three crews at the beginning of the project were contemplating incentive payment schemes. None of these schemes were based on the direct financial performance of the logging crew, nor was the financial performance of any of the logging crews discussed with the employees.

Research on HPWS suggests employees earnings should be linked to company profits so that each employee works in a manner similar to the business owner. In the New Zealand logging industry it appears very unlikely that the contractor's financial information would be divulged to the employees in the future. In all crews except one the employees worked hard to meet targets and assumed if they met production target the contractor's financial performance would be okay.

Networking and Collaboration to Foster Improvement

A feature of HPWS is collaboration with other firms in the industry. It was surprising how little effort was made by each crew to collaborate with other crews or to keep abreast of latest techniques for improvement. Importantly though, contractors understood that there is huge risk to their business associated with escalating costs. The contractors understood that forestry companies simply cannot continue to pay higher logging rates and this is perhaps one reason for the effort contractors are putting in to improve productivity generally. The contractors that were part of this project were relatively conservative in terms of productivity improvement investment.

Information Sharing

In its purist form employees working in HPWS have extensive access to management information (both performance and financial information), are self-managing and work with their peers to improve work methods and procedures without too much management input. In this pilot project it was observed that the role of each employee was well defined and that generally they worked well as a team; however many team members admitted they could have done more to ensure the job of the next person in the chain was made easier.

One crew demonstrated these organisational boundaries and lack of information sharing when the tree faller expressed satisfaction with the amount of timber felled but did not realise the impact his actions had on the breaker-outs in one area where the trees had been felled in all directions. The production of the whole crew plummeted while the breaker-outs sorted out the problems. In this circumstance if the faller had considered the next phase of the operation, and slowed down to ensure better felling direction, overall productivity would have been improved. In a high performance working environment there would be real-time information flow across organisational boundaries (each production interface) to ensure maximum organisational performance.

More focus on making the job easier for the next person in the chain would help improve productivity. Eliminating loss is an area that needs focus and a standardised and systematic approach to improve this is required. A number of systems are available for collecting this information (such as real time data loggers), but generally contractors don't have the funds to purchase these, or the inclination to analyse data to see where improvements can be made.

DISCUSSION

Self-management

Health and Safety legislation requires the contractor to take all practicable steps to ensure safety of the employees. Logging requires decisive management as operational plans can change often during one day. If the wind strength changes or a machine breaks down a new plan needs to be developed and the corresponding hazard controls put in place. Therefore one person needs to be responsible for changing plans and conveying the new plan to all employees and ensuring the appropriate health and safety management is in place. Leaving decisions to capable staff that do not have an overview of the whole operation could pose a serious health and safety liability for the contractor. If an accident did occur, operating self-management under HPW systems might not be an adequate response to “taking all practicable steps” to ensure health and safety of all employees. Contractors and crew managers need to take a very active role in ensuring all employees are supervised closely, especially with the heightened focus on health and safety in logging operations.

Top performing logging crews are generally the best purely because there is a detailed work plan in place, the job is well organised and one person has the ability to monitor the overall operation, analyse problems and make changes if necessary. The best crews usually have the contractor on-site, making decisions and communicating new plans when necessary. A team of highly skilled employees could work autonomously, but many logging crews struggle to keep a highly trained crew together, especially as there is high demand for skilled workers in an expanding industry such as forestry. Brian Tuor’s view of the needs of the forest industry is simple, “Invest more in training and lift the level of expertise and that would go a long way to improving productivity”.

Analysis of New Ideas

Traditionally it seems, very little analysis is done prior to purchasing new equipment unless it is replacement equipment. In this case there is a trade-off between the increasing costs of repairs and maintenance cost and downtime versus the cost of financing and higher depreciation of a new machine). For smaller equipment items such as carriages, grapples and camera systems, decisions on whether to buy or not are based more on “gut feel”. Larger investments such as feller bunchers and processors are analysed on the basis of extra production multiplied by the logging rate covering off the additional daily cost (plus a profit margin). Being able to calculate financial indicators such as internal rate of return (IRR), payback period (years to positive cash) and Net Present Value (NPV) would help contractors with the decision to purchase and also with discussions with the forestry company around sharing benefits of the new item. As part of this project all ideas that required new capital were analysed financially to determine NPV, IRR and payback period.

Over the past two or three years some logging contractors have made significant changes to logging systems to help improve safety and productivity. Use of steep slope (winch-assisted) feller bunchers and grapples is becoming more common.

Sustainability of HPW Systems

At a time when returns from traditional sources of competitive advantage (such as quality and economies of scale) are diminishing, the strategic importance of the human resource as a source of competitive advantage has increased. Organisational systems that attract, develop and retain intellectual assets (such as highly trained and skilled operators and maintenance staff) are emerging as significant elements in business development. The development of a high performance workforce remains a significant unrealised opportunity for many organisations.

Despite the demonstrated benefits of HPWS there are organisational barriers that continue to hinder the forest industry from increasing organisational effectiveness. These include hierarchical and power barriers. To implement HPWS across the forest industry would require a significant change from the current “master-servant”, command and control-oriented organisational structures to those where contracting firms are fully self-managing partners in the forest harvesting system. Added to this, the health and safety liability of all employees within contracting firms becoming self-managing would probably be too high for a complete change to be made.

Improving productivity must be well planned and controlled, as many forestry companies have a set volume to harvest using a given number of logging contractors. So implementing change (especially in productivity) without the commitment of the forestry company cannot work. An example was demonstrated during this pilot project where one contractor implemented a seven-day operation and reported it was not successful as truck scheduling had not changed and this had a negative impact on harvesting production.

The management structure, culture, and processes all need to support and embrace HPWS for it to be successful. HPWS is typically a drastic departure from most current organisational management structures where contractors and workers are directed instead of doing the directing, and without the support of management HPWS will likely fail.

A key success factor in HPWS is definition of business strategy, vision, mission, and goals. A contracting firm will not achieve high performance unless their efforts are in alignment with the forest company’s mission and goals. All contractors should be encouraged to develop business plans and generate ideas for business improvement (such as increasing productivity or reducing costs). This business planning should be a contractual requirement of all contractors (unless open market tendering is the procurement mechanism in place).

To be sustainable, the business improvement process must be systematic and not undertaken in an ad-hoc way. Both the forest management company and the contractor must work together to have an agreement in place on how the improvement process will operate and how any benefits shall be shared. Then they can develop new ideas, analyse and trial them and if successful, implement them. Considering the improvement ideas the six crews in this pilot project generated in a short period of time, there is no doubt that not only the contractor but also their employees should be part of this process. Such internally consistent and externally aligned (with forest company competitive strategy) work systems need to be embedded within the organisation as part of its normal activities. A simple process to encourage improvement initiatives to be captured, tested and implemented is shown in Figure 1. This would enable the common goal for both the forestry company and the contractor of becoming more profitable to be achieved.

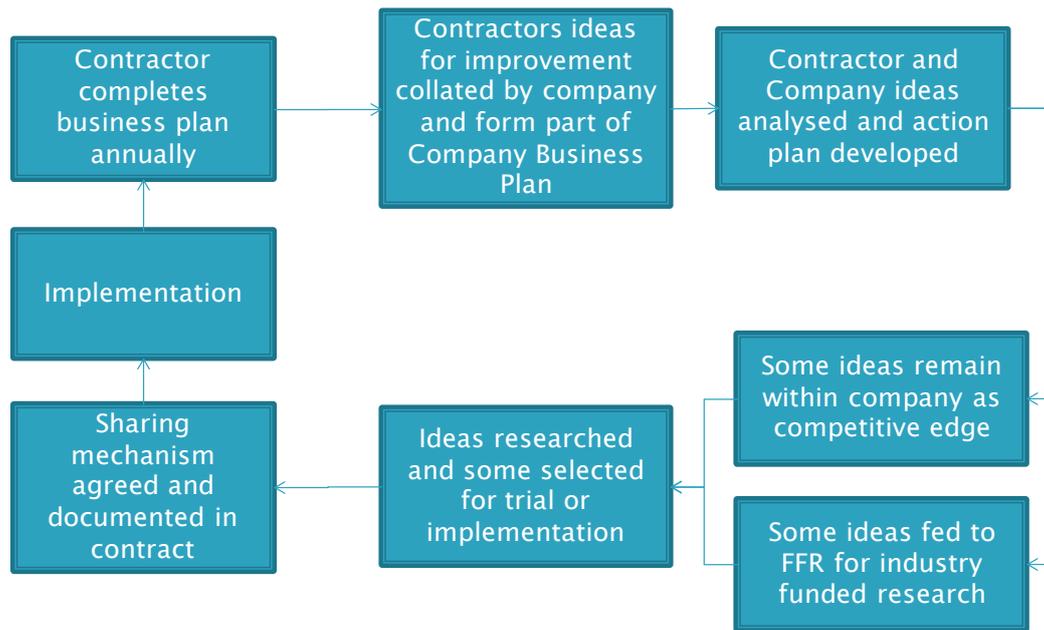


Figure 1: Recommended business improvement process

The achievement of business strategy implementation across the people, operations, customer and financial dimensions of each contracting firm should be measured using a contractor evaluation process. The balanced scorecard framework is one such model for measuring implementation of the business strategy and the firm's performance (Kaplan and Norton, 1996).

The development and success of HPWS will be based on its contribution to strategy implementation within both the contracting firm and the forest management company. Organisations that are more successful at applying the process in Figure 1 will be more successful in implementing both organisations' strategy.

Willingness to Share Benefits

One aspect that will have an influence on the prospects for change to HPWS (or other innovations) is the extent to which the value created by improving organisational performance is shared between the forest management company, the contractor, and its employees.

The gains to the forest management company will be in terms of a more flexible and reliable contractor workforce able to better meet the demands of rapidly changing product markets at competitive rates. The gains to the contractor accrue from reduced direct management input due to the improvement initiatives generated from the high performing employees, higher productivity or reduced costs, resulting in increased business cash flow. The contractor will have more time to work on the business, in terms of strategic direction and decision-making with the forestry company, rather than in the business as a working crew member. The gains to the employees could take the form of increased job satisfaction from self-management, greater employment security and higher compensation based on improved firm performance.

As demonstrated in this pilot project, properly implemented HPWS will increase productivity and contracting firm performance. Neither the contractor nor the forest management company can appropriate all the gains from this improved performance without losing the cooperation and willingness of the other party to further innovate. There is still a lack of trust evident in the logging industry between logging contractors and forest management companies when it comes to sharing in gains from new methods of work.

The expectation of both the logging contractor and the forest management company on how and when to share the benefits from improvements should be agreed and stated in the contract. The conventional model of the contract between the logging contractor and the forest management company is one in which both parties have a common interest in maximising the value of their relationship, but competing interests in how that value is distributed.

The difference between the services contracted for, and the services actually provided impose a cost on the forest management company that can be minimised with the appropriate combination of contract monitoring, management and financial incentives (through gain sharing).

CONCLUSIONS

At the start of this pilot project none of the six participating contracting firms had heard the term “high performance work”. However the crews were using some of the elements of HPWS simply because it seemed obvious or the right thing to do. This project showed good leadership was in place, and all crews were motivated to do well and were observed working hard. It was noted from discussions with employees of all six crews that their respective employers were reasonably good at keeping the focus and ensuring that motivation remained high. Employees generally liked their work and a good working culture was in place.

While self-managed employees may work in the manufacturing industry, the health and safety liability of having self-managed employees in the uncontrolled logging environment may prove too high. This may limit the full adoption of HPWS in the logging industry.

Even though previous researchers have suggested that partial use of HPWS is unlikely to be productive, there could be benefit to the logging industry for some of the elements of HPWS to be incorporated into the day to day running of logging contracting firms. A process of strategic planning incorporating developing annual business plans, and a process for capturing new ideas and innovations aimed at improving productivity and reducing costs within each contracting firm would be hugely beneficial.

Elements either not evident or not well developed included extensive management development training linked to the needs of the business. Training within individual contracting firms appeared to be limited by funding. Training was viewed as a cost that can be reduced for a period of time. While all the employees within the six crews in this pilot project were trained for their current role only one crew was training employees for different roles. In-depth training in cable mechanics, tension, deflection and its impact on cable payload is lacking, and consequently the critical effect of these factors on logging productivity is not well understood by all employees. Higher level training of cable crews in these subjects would be beneficial.

Some of the key features of HPWS are also evident in the relationship between forest management companies and logging contracting firms in New Zealand. These include rigorous recruitment and selection procedures (through the contract procurement process) and performance-based compensation systems. However, many of the key features of HPWS are not evident. These include: employment security (contract tenure); self-management and decentralised decision-making; reduction in status distinctions and barriers; and extensive sharing of financial and performance information.

Over the past 25 years most forest management companies in New Zealand (but not all) have increasingly operated “at arm’s length” from their independent contractors. With the changes to employment and health and safety legislation, it may be time to consider revising this management approach and developing more of a partnership approach with logging contracting firms. This would involve agreeing on a mechanism for sharing of the benefits of improvement ideas, to help drive and support the implementation of those improvements. Some forest management companies already have this approach in place and others are actively encouraging the mentoring of individual contracting firms.

RECOMMENDATIONS

The following are the authors' recommendations arising from the pilot project:

- Forest management companies and their logging contracting firms to develop a strategic and business planning process for contracting firms that dovetails into the forestry company's own business planning process.
- Forest management companies and their logging contracting firms to develop a contractual protocol on the sharing of benefits from improvement initiatives.
- Forest management companies to have a logging contractor evaluation process in place.
- Forest management companies and their logging contracting firms to clearly identify the funding stream for training and ensure this allocation is spent on training.
- Contracting firms to collect and analyse appropriate production and financial information in order to better understand loss and inefficiency in their firms.
- Forest management companies to work with and support their logging contracting firms in the early adoption of new logging concepts, methods and technology.

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APPENDIX 1 – MANAGEMENT THEORY

Total Quality Management (or TQM) is a management concept where the principal aims are to improve quality by ensuring conformance to internal requirements. Among the many ways that this can be accomplished are: reduce the errors produced during the manufacturing or service process, increase customer satisfaction, streamline supply chain management, aim for modernization of equipment and ensure that workers and employees have the highest level of training possible.

Lean manufacturing is a continuous improvement process developed by Toyota and is focused on getting the right things to the right place at the right time in the right quantity to achieve perfect work flow, while minimising waste and being flexible and able to change. These concepts of flexibility and change are required to allow production levelling. The flexibility and ability to change are within bounds and not open-ended, and therefore often not expensive to implement. The theory is that the employees who build the products act as though they own the processes that deliver the value. The cultural and managerial aspects of lean manufacturing are possibly more important than the actual tools or methodologies of production itself.

Six Sigma is a business management strategy which seeks to improve the quality of process outputs by reducing or eliminating defects and defective processes. This is done by identifying and removing (or minimising) the causes of defects (errors) and minimising variability in manufacturing and business processes. It uses a set of quality management methods, including statistical methods, and creates a special infrastructure of people within the organization ("Black Belts", "Green Belts", etc.) who are experts in these methods.

Kaizen (continuous improvement) is a daily process, the purpose of which goes beyond simple productivity improvement. It is also a process that, when done correctly, humanizes the workplace, eliminates overly hard work and teaches people how to spot and eliminate waste in business processes. Kaizen generates total quality management, and frees human efforts through improving productivity using machines and computing power. Kaizen methodology includes making changes and monitoring results, then adjusting.

Continuous Quality Improvement (CQI) is an approach to quality management that builds upon traditional quality assurance methods by building and strengthening the company's organisation and systems and focusing on "process" rather than the individual. Application of CQI recognises both internal and external "customers" and promotes the need for objective data to analyse and improve processes. CQI management philosophy says most things can be improved. At the core of CQI is serial experimentation (using scientific methodology) which we apply to everyday work tasks in order to design and implement solutions to client problems.

Continuous Improvement Process (CIP) is where business processes are constantly evaluated and improved in the light of their efficiency, effectiveness and flexibility. For CIP to be most effective, it must become a "state of being" process, itself, whereby all employees participate, contribute and adhere to its outcomes.

APPENDIX 2 – BASELINE QUESTIONNAIRE

High Performance Work – Employee Questionnaire					
A Building Leadership and Management Capability					
1	Structure	Has your employer told you what the business values and goals are	No	Yes	NA
2	Training evaluation	Are you satisfied with the amount of training you receive	No	Yes	NA
3	Training plans	Do you have a training plan with your boss	No	Yes	NA
4	Performance appraisals	Does your employer tell you how you are performing as an individual	No	Yes	NA
5	Relationship between Contractor and employee	How would you rate the relationship between you and your boss	Very Good Good OK Not Good Terrible		
6	Work environment	Is your work a good place to be	Never Not usually OK Sometimes Mostly		
7	Empowering employees	Does your boss encourage you to make decisions to improve the performance of your job	No A Little A Bit Sometimes Mostly		
8	Innovative thinking	Does your boss listen to your ideas for improvement	No	Yes	NA
B Creating Productive Work Cultures					
1	Employee consultation	Does your boss ask you for your opinion on the operational plan (how the trees will be felled, extraction direction etc)	No	Yes	NA
2	Satisfaction with decision making	Overall are you satisfied that your boss includes you in improving work	No	Yes	NA
3	Business goals	Does your boss set objectives and targets and goals each week for you	No	Yes	NA
4	Reward for new ideas	Does your boss reward you for any ideas you have for improving the operation	No	Yes	NA

C Encouraging Innovation and the use of Technology					
1	Keeping upto date with new ideas	How do you keep up to date with new ideas			
2	Preparation for new technology	If the boss buys new machinery do you get training before it arrives (e.g get sent to another crew or the manufacturer before it arrives	No	Yes	NA
D Investing in People Skills					
1	Sophisticated recruitment	Did your boss interview you and test your knowledge before employing you.	No	Yes	NA
2	Openness	Did your boss tell you what it would be like working in his crew. How he sets targets etc,	No	Yes	NA
3	Career path	Does your boss discuss his plan (promotion etc) for you, moving from breakerout to hauler driver etc	No	Yes	NA
4	Management of Good employees	Does your boss reward you if you do well (ie additional pay etc)	No	Yes	NA
5	Job rotation	Does your boss train you in other parts of the job not just the one you are doing	No	Yes	NA
6	Training	How much training do you get Give details of last training:	None A Little A Bit Some A Lot		
7	More training	Do you consider the training you get is adequate	No	Yes	NA
8	Employee involvement	Does your boss include you in developing your training plan with him or the training provider	No	Yes	NA
E Organising Work					
1	Team work	Does your operation work as a team	No	Yes	NA
2	Team work	Does each employee make a special effort to make the next persons job easier	No	Yes	NA
3	Pace of work	Who sets the pace of work	Boss Forman Employee		

4	Role descriptions	Do you have a job description	No	Yes	NA
5	Continuous improvement	Do you discuss as a team ways to improve work performance	No	Yes	NA
6	Employee initiative	Do you make suggestions about how the workplace could be better organised.	No	Yes	NA
F	Measuring what Matters				
1	Individual performance related payment	Does your boss pay you a bonus for beating targets	No	Yes	NA
2	Team based performance related payment	Does your boss pay the whole team a bonus for beating targets	No	Yes	NA
3	Measuring performance	Does your boss keep performance records	Machine hours Man hours Number of stems pulled Delay times Reasons for delays Stocks Diesel usage Tonnage delivered Quality performance Training success Health and safety information		
4	Production meeting	Does your boss have a weekly production meeting	No	Yes	NA
5	Target setting	Does your boss set new targets for each cable setting or as a block	No	Yes	NA
6	Production	What volume did you produce last year			
7	Key performance measures	Do you know what the targets are. Production, quality, rope shift time, cycle time etc	No	Yes	NA
8	Customer satisfaction	Do you know what the company thinks of your team	No	Yes	NA

APPENDIX 3 – WORKSHOP CONTENT



High Performance Work Introduction



High Performance Work Team

- Strategic plan in place
- Everyone works as a team
- Process for capturing ideas for improvement
- Employees make decisions to improve their jobs
- Good training plan is in place
- There is a reward payment system in place



Feedback from one Day Visit

- General organisation
- Production
- Cycle time
- Delay time
- Team Work



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Strategic planning

- What's the view of the future and what does this mean
- Where are we at the moment and where do we want to be and how to get there
- Are there any gaps in our expertise to get there
- Setting goals
- Explore the specific factors that influence the teams performance



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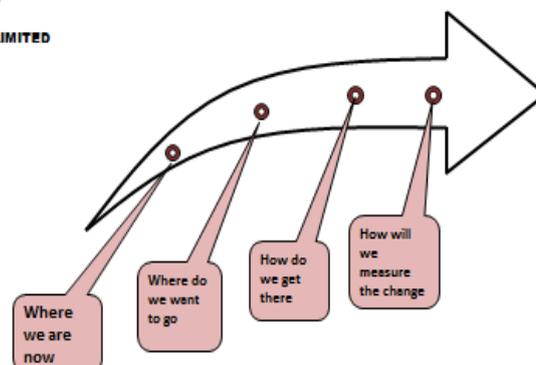
Strategic planning – cont'd

- Ideas required to meet goals and system to capture
- Allocating ideas to someone to action
- What will we measure and how to measure it
- You need the right information to make the right financial decisions.
- Ideas for incentive payment systems



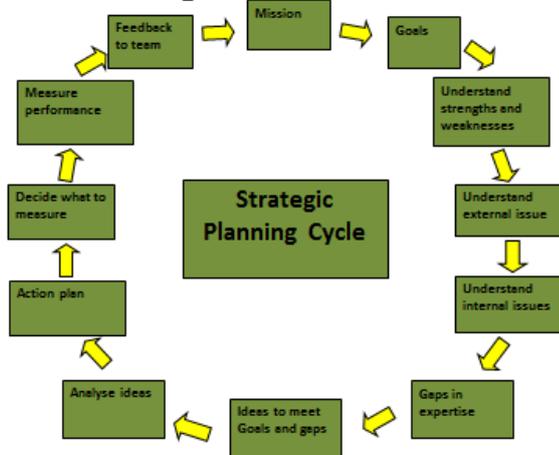
LOGPRO LIMITED

Strategic Planning





Strategic Plan Process



Mission

Your Mission Statement defines this teams purpose and objectives.

Eg "Is to be a high producing east coast logging team that has exemplary health and safety, environmental and quality performance and in doing so make life easy for forest management companies"



Situation Analysis - External

Situation	Implication	Our Response



Situation Analysis - Internal

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Situation	Implication	Our Response



Where are we at

LOGPRO LIMITED

Current Position - Where are we at?

Produced 52,000 tonne
 Averaged 48 cycles per day
 Averaged 2.3 trees per cycle
 Averaged 0.5 heads per cycle
 Averaged 6.2 hours productive machine time per day
 Employ 12 men (18 tonne/person/day)
 Used 197,060 litres of diesel (3.8l diesel per tonne)



Where we want to be Goals

LOGPRO LIMITED

Produce 60,000 tonne
 Averaged 60 cycles per day
 Averaged 2.3 trees per cycle
 Averaged 0.5 heads per cycle
 Averaged 7.0 hours productive machine time per day
 Employ 12 men (21 tonne/person/day)
 Use 216,766 litres of diesel (3.6l diesel per tonne)
 Implemented 3 good cost saving initiatives



Ideas to Reach Goals

LOGPRO LIMITED

Production

- 1
- 2
- 3
- 4
- 5
- 6



Ideas to Reach Goals

LOGPRO LIMITED

Health and Safety

- 1
- 2
- 3
- 4
- 5
- 6



Ideas to Reach Goals

LOGPRO LIMITED

Environment

- 1
- 2
- 3
- 4
- 5
- 6



Ideas to Reach Goals

LOGPRO LIMITED

Quality and Value

- 1
- 2
- 3
- 4
- 5
- 6



Goals Example

LOGPRO LIMITED

Goals	Objective	Method	Measure (KPI)	Person	Action	When
Improve production	New machinery	Mechanise delimiting	Less chain	John	John to purchase Static Delimber	May
			One less skiddy	Fred	Change to Freds job	June
	Faster line shift	Pre-rigger	Skiddy now pre-rigger	Fred		



Creating the Measures

LOGPRO LIMITED

KPI	Measure	System to Measure	Person in Charge



Holding Production Team Meeting

LOGPRO LIMITED

Production Team Meeting Agenda – An Example
Production Plan for Next Week
Production Target for Next Week
Areas Where Production will be issue •Develop action plans to mitigate issues
Rope and Hauler Shifts •Discuss action plan for week coming •Pre-setting •Deadmen
Health and Safety Issues •Develop action plans to mitigate issues
Environmental Issues •Develop action plans to mitigate issues

APPENDIX 4 – KEY PERFORMANCE MEASURES: CURRENT

Production Key Performance Indicator	Measure
Trees extracted per day	140
Volume per day	250
Volume per year	60000
Cycles per day	60
Shifting time per week (hrs)	5
Productive hours per week	35
Scheduled hours per week	45
Number men employed	12
Days lost per year to shift hauler to new landing	24
People First Indicators	Measure
Acceptable accident rate	LTI<10 5 year rolling
Man-hour information on time	< 3days after month end
Accident reports on time	<3 days
Bonus system in place	Based on production
Environmental Key Performance Indicators	Measure
Complete work as per work prescription	As planned
Formal plan changes in place and signed	100%
Fuel tanks well bunded	100%
Quality Key Performance Indicators	Measure
Logs within specification	< 2.5% rejects
Maximum value obtained against cut card	>95%
Log stocks accurate	+/- 10%
Waste Minimisation Indicators	Measure
Paint use	
Safety clothing and boot use	
Chainsaw chain use	

APPENDIX 5 – NEW TARGETS

Productivity Key Performance Indicators	Measure
Trees extracted per day	160
Volume per day	285
Volume per year	70000
Cycles per day	65
Shifting time per week (hrs)	5
Productive hours per week	35
Scheduled hours per week	45
Number men employed	12
Days lost per year to shift hauler to new landing	12
People First Performance Indicators	Measure
Acceptable accident rate	Zero LTP's and Medically treated injuries < 2 per year
Man-hour information on time	< 3days after month end
Accident reports on time	<3 days
Bonus system in place	Based on production
Environmental Key Performance Indicators	Measure
Complete work as per work prescription or formal plan change in place	100%
Fuel tanks well bunded	100%
Quality Key Performance Indicators	Measure
Logs within specification	< 2.5% rejects
Maximum value obtained against cut card	>95%
Log stocks accurate	=/- 10%
Waste Minimisation Key Performance Indicators	Measure
Paint use	
Safety clothing and boot use	
Chainsaw chain	

APPENDIX 6 – BUSINESS PLAN EXAMPLE

FASTER Logging High Performance Work Plan



OWNERS

FASTER Logging Limited

18 Blue Street
Waihao 4123
New Zealand

Executive Summary

FASTER Logging has a vision to be Forest Company Key Supplier of harvesting services. This plan develops ideas and processes for FASTER Logging to be highly effective loggers and to ensure there is a continuous improvement process in place. This plan will be updated annually.

FASTER Logging's view of the future is that steep country harvesting will have difficult times ahead with upward cost pressure on diesel, wages and cost of equipment. FASTER Logging believes the upward pressure on costs could increase harvesting costs by \$8 to \$10 dollars over the next 3 to 5 years. This plan develops ideas to improve productivity and in general to develop high performance.

The main areas for focus to improve productivity will be;

- To analyse the idea of having a second Koller tower which can be preset ready for future shifts. Currently shifting the hauler accounts for 10% of the down time.
- To concentrate on felling direction to reduce breakage. This requires the development of a new felling wedge which we have engaged Scion/FFR to help with.
- To work as a team to reduce unproductive time.
- To be early users of new technology to help reduce unproductive time.

Through a process of continuous improvement FASTER Logging will strive for its Vision to be Forest Company's New Zealand Key Supplier of Logging Services and to achieve its Mission to be a high producing and profitable New Zealand logging team that has great health and safety, environmental and quality performance providing a solid platform for growth.

Company Description

FASTER Logging Limited was incorporated in April 2011. The Directors, Bud Spencer and Terrence Hill have an equal shareholding. Both Bud and Terrence originated from Big Hill Logging Limited a key logging supplier to Private Forest Industries and have an excellent grounding in cable harvesting.

FASTER Logging is an exclusive Forest Company cable logging operation working in the New Zealand region. FASTER logging has a vision to become Forest Company's key logging supplier.

Forest Company provides a stable working environment with both strong export markets as well as their own domestic mill. New Zealand in general is a growth region and therefore opportunities for business growth will occur in the medium term (5 yrs.).

The operation currently consists of (not including work vehicles);

- Koller 504 hauler
- 2 x Caterpillar 324 excavators
- Komatsu D65 tractor
- One Harvest Tech static delimeter
- 11 staff

Future View of New Zealand Harvesting

The New Zealand region has substantial opportunity for growth, refer to graph below which shows the volume of wood coming on stream in the next 10 years. With growth however there will be likely staffing shortages which are a catalyst for wage hikes. Diesel price is also a significant risk factor and likely to rise in the near to medium distant future. Foreign exchange rates are also a risk factor to both export log sales revenue and ultimately log demand and higher cost of new equipment. These three risk factors alone will increase logging costs by \$8 to \$10 per tonne and increase the cost of the supply chain at mill gate by \$20 per tonne. Many New Zealand forests could well have a negative stumpage if supply chain costs increase to these levels without additional revenue from log sales, refer to graph to for long term log sale trends suggesting increasing log prices are unlikely to happen. FASTER logging needs a plan to continuously develop ideas for more productive ways to log for less cost.

A more detailed view of the threats to and opportunities for harvesting in New Zealand and the strengths and weaknesses of FASTER Logging are outlined in the Tables 1-4 below.

Table 1: Threats to harvesting in the region

Threat	Importance	Response
Limited workers	high	Ensure all staff is included in the improvement process and are rewarded appropriately.
Rising costs	medium	Ensure a continuous improvement process is in action so that when the cost of production rises some of the extra cost can be absorbed if rate negotiations get more difficult. FASTER logging needs a plan to minimize the effects of rising fuel cost.
Machinery breakdowns	medium	Ensure a rigorous routine maintenance programme is in place, especially for the hauler. Carry some spare parts (airbags and clutch and brake parts) and expand the network of people who can help with quick repairs.
Reducing revenues from log sales	high	Ensure a continuous improvement process is in action so that when the cost of production rises some of the extra cost can be absorbed

Table 2: Opportunities for harvesting in the region

Opportunities	Importance	Response
Increasing New Zealand annual cut	medium	Increase equity in FASTER logging to take advantage of new opportunities. Have a process in place to continuously check on financing options available that would suit the business and allow for expansion.
Limited source of New Zealand contractors	low	
Processes in place to discuss ideas for improvement	high	Develop a formal process for capturing, analyzing and actioning good ideas.

Table 3: Strengths of FASTER Logging Limited

Strengths	Importance	Response
Young and keen	high	Can work longer hours and Saturdays as required
Good Staff	high	Ensure low turnover through incentive payment processes.
Fully automatic Koller hauler	low	
Shareholder is lead breaker out	high	Shareholder heavily involved in productivity
Two owners	high	More ideas for improvement and sharing of management workload
Productive	high	Team is focused on production

Table 4: Weaknesses of FASTER Logging Limited

Weaknesses	Importance	Response
Staff living away from home and remoteness	high	Ensure an appropriate payment system is in place and is working.
Two owners	low	May disagree on future direction.
New business so still acquiring business management skills	low	Improve business management skills.
Hauler takes a lot of time to shift	high	Requires focus and analysis for change. Analyse the cost of running another pole.
New business, so high debt to equity ratio	high	Work hard to increase equity position. Make decisions based on well researched and financial analysis for further investments.

Vision Statement:

To be Forest Company's New Zealand Key Supplier of Logging Services.

Mission Statement:

To be a high producing and profitable New Zealand logging team that has great health and safety, environmental and quality performance providing a solid platform for growth.

The company has a philosophy of working hard as a team, having fun at work and is serious about doing a great job. The philosophy puts FASTER Logging in good stead to strive toward their vision. FASTER Logging's strength is its staff that is right behind the two shareholders in making this operation a success and the strong relationship the company has with Forest Company. The critical success factor will be to ensure the core staff of FASTER Logging remains in place and there are processes in place to run the operation efficiently and to always seek improvement.

The vision of FASTER Logging is to be Forest Company's top performing and reliable logging contractor. FASTER Logging's goals are to;

- Have a "people first" culture whereby all team members look out for each other's safety as well as their own and aim to eradicate any risky acts and in doing so reduce accidents to zero. To have a training programme in place to ensure staff are multi-skilled and to implement a robust incentive payment system to reward staff when performance is good.
- Have a quality culture whereby all team members ensure no reject logs leave the logging site and no logs are lost to downgrade.
- Have a focus on maintaining a sustainable environment, specifically with respect to waste, fuel management and slash management.
- Develop a productivity culture where all team members regularly discuss ideas to be more productive and cost efficient.
- Develop a cost minimization culture where all team members are active participants of reducing waste.
- Achieve success doing each of the above to ensure recognition as a High Performance Crew and ensure the business is financially strong and provides a basis for future expansion.

Targets and Key Performance Indicators

Table 5: Current Achievements

Production Key Performance Indicator	Measure
Trees extracted per day	140
Volume per day	250
Volume per year	60000
Cycles per day	60
Shifting time per week (hrs.)	5
Productive hours per week	35
Scheduled hours per week	45
Number men employed	12
Days lost per year to shift hauler to new landing	24

People First Key Performance Indicators	Measure
Acceptable accident rate	LTI<10 5 year rolling
Man-hour information on time	< 3days after month end
Accident reports on time	<3 days
Bonus system in place	Based on production

Environmental Key Performance Indicators	Measure
Complete work as per work prescription	As planned
Formal plan changes in place and signed	100%
Fuel tanks well bundled	100%

Quality Key Performance Indicators	Measure
Logs within specification	< 2.5% rejects
Maximum value obtained against cut card	>95%
Log stocks accurate	+/- 10%

Table 6: Targets for the coming year

Productivity Key Performance Indicators	Measure
Trees extracted per day	160
Volume per day	285
Volume per year	70000
Cycles per day	65
Shifting time per week (hrs.)	5
Productive hours per week	35
Scheduled hours per week	45
Number men employed	12
Days lost per year to shift hauler to new landing	12

People First Key Performance Indicators	Measure
Acceptable accident rate	Zero LTI's and Medically treated injuries < 2 per year
Man-hour information on time	< 3days after month end
Accident reports on time	<3 days
Bonus system in place	Based on production

Environmental Key Performance Indicators	Measure
Complete work as per work prescription or formal plan change in place	100%
Fuel tanks well banded	100%

Quality Key Performance Indicators	Measure
Logs within specification	< 2.5% rejects
Maximum value obtained against cut card	>95%
Log stocks accurate	=/- 10%

Implementation Plans

To ensure the targets can be met during the next 12 months it is important to identify an action plan and delegate responsibilities to ensure the plan happens. Regular measuring of performance to plan is required and it is important that the whole crew is updated as per the performance against plan.

Table 7: Implementation Plan for Improving Productivity

Objective	Goal	Method	Measure	Person	Action	When
Productivity Culture	Produce 70,000 tonnes per year	Cutover camera trial	<3% non-productive time	BO's Hauler Operator	Spencer to organize trial	October
		Poley to talk drag onto landing	<3% nonproductive time	Poley	Bud to train poley in signals and RT	October
		Morning tailgate meeting to discuss work plan and production targets	<3% nonproductive time	Terrence	Terrence to run tailgate meetings	October
		Productivity sheets	Sheets in place and working	Hauler operator	Bud to put productivity sheets into practice	October
		Analyse the value of obtaining another hauler pole	Reduce hauler shifts to <12 days per year	Bud/Terrence	Spencer to find pole and analyse whether good investment or not	October
		Reduce breakage during felling and breakout	<16 heads extracted per day	Terrence	Spencer to work on developing a light weight felling wedge	April
		Production based incentive payment scheme	In place	Bud/Terrence	Bud/Terrence to design and implement	January
		Set targets per setting	Targets met setting by setting	Bud/Terrence	Bud to calculate on a weighted basis a production target for each setting	October

Table 8: Implementation Plan for Developing People First Culture

Objective	Goal	Method	Measure	Person	Action	When
People first culture	Zero accidents	Report and record accident saving incidents and reward	3 serious harm saving incident stopped and reported per person per week	All crew	Bud to organize report system	October

Table 9: Implementation Plan for Improving Quality Culture

Objective	Goal	Method	Measure	Person	Action	When
Quality culture	<3% rejects	All logs to be QC'ed and Loader driver to remove any suspect logs at time of loading	<3% out of spec logs leave crew	Loader operator	Loader operator	October
	>95% Value	Highly trained logmakers	>95% value achievement	Logmaker	Bud	October

Table 10: Implementation Plan for Improving Cost Minimisation Culture

Objective	Goal	Method	Measure	Person	Action	When
Cost minimisation	Reduce consumable costs	Report consumable costs to crew each month	5% reduction of consumables for 2013 year.	Bud/Terrence	Bud to report to crew monthly	October

Table 11: Implementation Plan for Improving Sustainable Environment Culture

Objective	Goal	Method	Measure	Person	Action	When
Sustainable environment culture	Reduce any environmental risk	Report any requirement in harvest plan that will be difficult to meet from environmental view	Zero environmental incidents	Bud/Terrence	Bud to formally report to Forest Company	October
	No rubbish	All rubbish to be placed in bins and removed	Zero rubbish lying around	Bud/Terrence	Weekly check of site	October

Table 12: Financial Analysis of Investment in an Additional Hauler Pole

	Additional revenue from investment		
Investment	Year 1	Year 2	Year 3
-80000	36000	36000	36000
NPV	\$5,773	Cost of Capital	12%
IRR	16.65%		

Net Present Value Analysis of investing in a second hauler tower over a 3 year period. The above analysis suggests that the investment in an additional hauler pole is a good idea, as long as a shifting system can be developed using one of the existing excavators for a total cost of importing and setting up for \$80,000.