# STANDARDIZATION OF THE EUCALYPTUS GRANDIS SAWMILL PROCESS OF SEARCHING FOR COMPETITIVENESS NECESSARY FOR AN EXPORT OPENING

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## SUMMARY

The present paper has as objective to research the effects obtained as a consequence of a re engineering, carried out in the management in an important Eucalyptus grandis sawmill of the Argentine Republic. The revision of the main management parameters is considered, connected to the logical sequence of decisions that included from the redefinition of the staff, passing through new schemes of felling and even the orientation to new domestic and foreign markets. Among the industrial process parameters more sought for by this re engineering, was to obtain a standardization of the sawing processes in such a way that the noticeable oscillations which did not allow being certain of the true productive capacity, could be diminished. In the present paper, one describes not a series of technique-operative decisions, but also the training scheme of intermediate authorities and the promotion of leadership as a fundamental pillar that sustained the desired organizational change. The need of improving the economy results of the enterprise, led to that simultaneously, with the redefinition of the productive processes, the destination of the

production was reoriented to offer its products to extremely competitive markets, such as Asian garden furniture and United States packing.

**KEY WORDS:** Felling, Eucalyptus, Optimization, Competitiveness, Export.

## INTRODUCTION

There exist management productive models that present certain particular advantages with respect to operative costs that in many cases usually tempt entrepreneurs when calculating economic margins as results of “projecting" that situation on a greater scale.

In forestry industry it is quite common to conceive that the manufacture of certain products brings together with it the demand of such by the simple reason of having manufactured it. That conception of the economy activity we could define it as “Mill Made Vision “(MMV).

In the times of oversupply of products in which we find ourselves, to maintain a MMV philosophy, it can practically be considered as to be messianic, because in fact the true potentiality of subsistence in the commercialization is in satisfying in time and forms, the demand of market goods and services, which is being supplied.

Said in another way, to have a low production cost, could favor precise indicators, during short periods of time, but once reviewed the economy cycle, and demonstrated that the only things that grow are the stocks (that by the way, wood in certain way is a perishable material), ends up demonstrating that the once low costs, are not such due to their low rotation.

In this case, which we are analyzing, this situation which has to do with sawn Eucalyptus grandis wood production, brings together with it, an intrinsic characteristic to the wood itself, that is, its high proliferation capacity of cracks and its fast oxidation or change of color if it is seasoned outdoors.

At the time of carrying out a change of management scheme, there was in stock an equivalent to 2.5 weeks of production (about 3,000$m^3$) of sizes impossible to be commercialized as sleepers of 5"x8", 6"x6", 8"x8", 10"x10", 6"x8", that had shown highly productive results in previous months, but that had put the enterprise in an extremely negative financial economy condition. This production scheme (MMV), does not agree with Abreu (2005) concept, what distinguishes the enterprise, the innovating enterprise from the traditional enterprise, is the permanent commitment with the excellence of the products/services and the client's satisfaction.

This proves that the enterprises oriented by these values, modernize their work processes, stimulate innovating practices, bureaucratize administrative procedures, redouble the efforts and develop the human talents they have, with the added value that incorporates enthusiasm to participate in a work model into a successful team, understanding as a success, the reiteration of productive acts - of distribution – being paid which make possible not only the subsistence of the enterprise, but also the contribution of dividends to the shareholders. The identification of a proactive leadership constitutes a synergy that goes beyond the management or conductive bodies and generates a virtuous circle that multiplies the internal effectiveness of the enterprise. Agreeing with the concepts that Senge (2004) mentions, the organization which invests time and efforts in fomenting the integration of knowledge of the total involved ones, generates a wheel or motor that in medium term self impulses, incorporating new individuals to participate in the wheel, as a result of which they see themselves attracted by the general improvement of the surroundings, and the actors themselves of the productive process.

The objective of the present paper is to manage to clarify the strategic steps that made it possible to transform MMV culture into an effective and competitive Eucalyptus grandis' sawmill with opening to international markets. The hypothesis presented by this paper is that there is a logical sequence of decisions, that can lead to a scheme or model of sawmills optimization, similar to the one studied.

## Methodology

In this research, of quantitative and descriptive type, the gathering of data was done by a survey of checked management data with management personnel of the analyzed enterprise, a team in which the author himself was a member.

To carry out the presentation of the results, registries of the enterprise were summarized related to management variables such as production level, cutting or felling schemes, personnel, productivity and commercialization among the most outstanding.

With the intention to show a clear contrast between two management models through which this enterprise had to go through, in circumstances of re-engineering faced, it was defined to show a period of time of a year, in which the first six month, show the management parameters of the model, that searched to be optimized and the other six months are related to the values of the variables, once carried out the contemplated actions in the reorganization of the enterprise.

The data collection was carried out not only with the objective to present this paper, but also for possible new ones. The selected research was done in software Microsoft Office Excel 2003.

## Development of the Results

Contrast of the quality of Raw Material versus Market Demand:

In the forestry industry process business re sawn wood, the quality of the obtained raw material of the felling process, strongly conditions the yield of the producing enterprise. In this individual case, at the time of re-engineering, it had been predefined to orient the dry sawn Eucalyptus grandis of better quality, to markets such as garden furniture and doors and windows, which traditionally are classified according to North American norms known as HNLA and whose degrees are FAS, F1F, SEL, #1C, #2C and #3c.

The intermediate qualities of sawn wood obtained, would also be oriented to the process of drying in the open air (know as “airing”) and later dried in a chamber to supply the enterprise’s own re-manufacturing plant that received the denomination of quality A, B and C.

As from these qualities were obtained the products with greater added value, such as dovetail joints, decks, moldings and floors.

Finally, with the portion of lower quality obtained from the considered species, and by its highly unstable behavior, lost humidity (being impossible its drying in a chamber), one tried to supply the national and export packing market, as also the construction one as from a quality identified as EV1 (green eucalyptus first).

In order to be able to determine the supply proportions to the different markets and to prevision the potential income, one had to know which would be the proportion of the different qualities, that could be obtained as from the processed logs. One looked, in coincidence with the concepts exposed for Drucker (1998) Drucker (1998), shifting material into resource

As the enterprise considered, had a log classification system, it was decided to do a series of " batch test " contemplating in each batch an amount of 30 logs of each diametrical class.

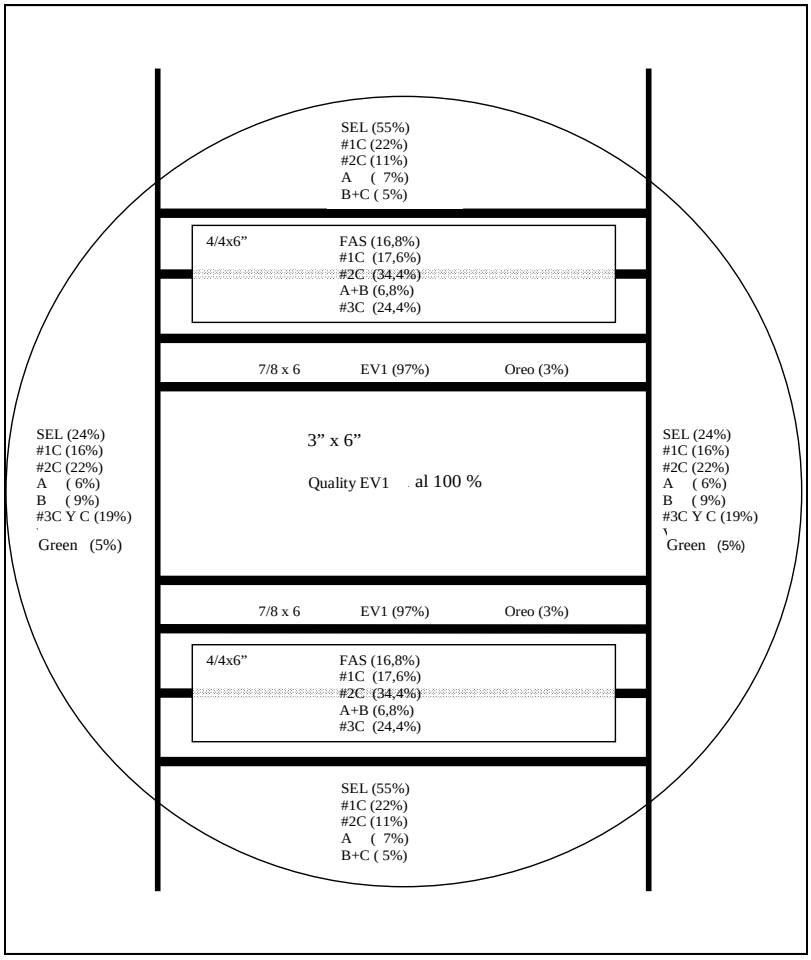
Each test in itself considered the measurement of the volume of the 30 logs and the measurement of the total of the boards classified by quality and obtained at the exit of the sawmill.

Among the main variables that could be gathered as from each batch of logs tested we highlight:

- volumes of logs and green density
- yield or taking advantage in volume of the kind of log and according to the felling program.
- quality yield in the different felling schemes.
- Factory freights of the different machines (for example slab recovery)
- Families of long and wide boards obtained as natural consequence of the logs conicity.

A graphical chart is enclosed (Figure 1) that synthesizes the results of qualities obtained with the felling scheme planned for the diametrical class of 32 - 34 cm.

Figure 1. Qualities as from felling of logs from 32 to 34 cm.




**Source:** Own elaboration.

The primary target of these tests was to obtain a data base that made possible to know the commercial potentialities and the productive capacities for decision making.

Selection of personnel - first step towards the operative standardization: With the information of the capacity of generating qualities and estimated volumes of raw material to be processed, a reengineering was done on the operative personnel of the industrial plant, since it was observed that there was an excessive amount of manual laborers for the industry, to work in the new analyzed scheme. The excess of people would be re-assigned to another area of the same enterprise, replacing incorporations that were about to be made. In order to

define which people would continue developing their task in the sawmill, the selection was based on a quality-quantitative aspects with the new proposed operative scheme, in which one had to detect " positive leaders " or people who did not have any aversion to the change and that in their confidence towards the new management scheme, would function as a fluid communication channel. Among the main variables to have present were length of time in the enterprise, wage category, disciplinary antecedents, absenteeism, ability to work in a team, pro-activity towards peers, superior and technical capacity for the job, were contemplated.

The re-engineering carried out is summarized in Table 1:

**Table 1.** Reduction of personnel.

| Sector | | Reduction |
|---|---|---|
| A | Reception and debarking of logs | 6 |
| B | Entrance of logs to the sawmill | 2 |
| C | Supervisors | 3 |
| D | Band Resaw | 2 |
| E | Multiple | 2 |
| F | Sharpeners | 2 |
| G | Batten Reprocessing | 4 |
| H | Line of thin logs | 6 |
| I | Stevedores | 6 |
| | **TOTAL** | **33** |

**Source:** Own elaboration.

In the case of item A), the 6 people corresponded to 2 people who wrote down logs received in the 2 shifts and the other four people to the reduction of a shift of the debarking sector and log classification that operated one shift more than that of the sawmill.

In item B), they did without one post in which a person tape measured each incoming log. This information was obtained by means of the electronic scanner which is in the line of log classification, ordering simply the stocks and knowing the amount of consumed logs corresponding to a “pile" of classified diameters.

For the considered sector there were 5 supervisors, two for the sawmill’s machinery, two for the classification table or board exit and one for maintenance. There remained only one supervisor per shift (i. e. one in the morning and another in the afternoon) and the

maintenance supervision service was suppressed and the roles between the technical maintenance personnel were redefined.

The reductions of personnel re items D) and E), are related to technical improvements that made it possible to replace manual labor with electromechanical devices.

The case of the sharpeners (item F) the personnel was reduced, incorporating at first instance a greater level of intermediate stock as this was improved from the technical point of view, those matters which demanded greater manual labor.

The 4 people in which the batten personnel were reduced were related to an optimization of operations and processes flow control.

The line of thin logs (item H) functioned during 3 months as from the moment in which the management change was made (1st June) consuming the battens that were being deteriorated in the stock and once that was finished that line was discontinued, reducing the equivalent to 2 of the 6 stevedores who piled up their production (item I).

Re-engineering was done in very fast way so as to generate the smallest possible disturbance within the labor environment. On the other hand it was done only once, since the enterprises that in repeated opportunities, make restructures lose credibility and create an insecurity sensation that paralyzes all the members, greatly affecting productivity. If they do not drastically revert that spiral of sensations and non-productivity, it could lead them sooner or later bankruptcy.

The control board - second step towards operative standardization: The integral management that was desired to be implemented needed the monitoring of the main productive variables.

These variables had to be clearly communicated to all the establishment's operators and supervisors. Once this was done, it was informed that these would be monitored shift by shift and day by day. For this a communication slate for the sector was prepared and it was the responsibility of each supervisor, to update its data once the shift ended.

In all the cases, each variable to be monitored, considered on one hand the learning and on the other hand an objective value, and an associated symmetrical range. Thus before beginning each shift the objective to be sought for, was known.

This scheme of objectives incorporated to calculus forms, allowed to obtain a control board whose main power resided in the revision during each shift and after it, constituting a kind of “navigation chart” with the destination port and a route that is not always linear, but that allows to become aware of the corrections necessary to be made to the average desired course.

Among the main variables that are monitored in the control board we can highlight:

- Amount of logs consumed per shift: This variable allows standardizing the entrance of raw material to the plant. One of the two requisites that a sawmill needs to systematize, to obtain a stable management. Each size of log allows an amount of cuts to produce the desired boards. Generally from smaller sized logs less boards are obtained if the measurement of these is maintained. Therefore, to maintain a standard production level, a greater amount of thin logs and less thick ones, should be incorporated. Due to this, each group of machine operators knew the scale of amount of logs to be consumed, depending on the diameter. This made it possible for each operator to have a scheme of normal operation, not accelerated, thus making it possible to manage to diminish breakage or stops due by over freighting the equipment, transport and manual labor.
- Production per shift: This is one of the hardest variables to control, when a cultural change or reconstruction is made, since the magnitude obtained from it, generates direct average production cost. This value is chained downstream in the subsequent industrial processes because the sawmill cost is usually taken as transference value. The production level obtained, is the second fundamental requirement, that is necessary to be stabilized to obtain a competitive standardization of a sawmill. If the production levels are excessively variable, the product cost and its margin are transformed into unpredictable.

- Yield: The following up of this variable has a direct impact on the cost of the extremely important product, as traditionally it is only possible to transform into boards, only from 42% to 50% of the log that is bought. This factor along with the knowledge which is one of two accounting concepts that have greater incidence in the cost of the product (raw material and manual labor), shows the importance of monitoring and improving this variable.
- Uptime: The monitoring of useful working time known as Uptime, allows to detect in a sawmill, which are the faults that make it impossible to obtain a function, sufficiently predictable as to standardize the results associated to the production. In order to manage to improve this aspect, it is very common to accompany the data bases, generated as from registries of shutdowns in pie charts, bars, etc. In this case in particular, a special bar chart known as Paretto's diagram was used. This diagram organizes, in a decreasing way the bars, making it possible, at a glance, to detect the more significant reason for shutdowns and on which its reduction efforts can be centered.
- Obtained qualities: The monthly management of the sawmill must be contemplated as a link within the commercialization chain. From there the commitments assumed beforehand, with external and domestic clients must be rigorously monitored. At the moment in which a deviation is generated as to the predicted matter, its possible recovery is due to be analyzed and in what time term the normalization will be made. This is a concept, the one of deviations as to commitments, which in foreign trade is impossible to be sustained, and strongly attempts against business sustainability. On the other hand, a detailed system of monitoring was generated, of the average and superior qualities, since these ones require a drying process in the air, (known as in fresh air) that can vary several months, between 2 to 3, previous to its use for being sent to external clients as for consumption in its own re manufacturing plant. An unexpected reduction of a certain quality in the sawing process of the current month would prevent to obtain, for example, dovetailed wood of the desired quality

in the third or fourth month. This internal breach of transfer, would in principle result in lack of invoicing and if repeated, in a lack of customer loyalty and loss of clients. Due to the importance of this variable, the aperture of qualities was included, among the variables, to be monitored in each production shift.

- Absenteeism: From the very moment in which re-engineering was carried out; absenteeism index was practically reduced to half, going from 4.8% to 2.7%. It is understood that the personnel selection methodology, was effective by the reduction of this indicator. On the other hand this indicator monitored daily together with the Human Resources area, because its level contemplate impacts on productivity, quality, safety, (there are less trained people which act as substitutes in other posts) and costs. On the other hand it is extremely important to review the reasons for absenteeism, since if these deviations are not corrected, as it is very common that people that traditionally are not absent, they themselves become absentees.

Sustaining the change - increasing competitiveness:

It is very common that a desk strategy is only that, nevertheless in this case in particular one tried to generate a change, take care of it and to make it mature so as to be able to be the sufficiently firm facing possible market oscillations. Although in the domestic market the selected strategy of positioning was one of differentiation, in the external market the positioning had to be obtained as from the competitiveness tool.

In that aspect, a strategic plan of sustainable change was elaborated, that contemplated the following actions:

- Training: The managing group received training on subjects re leadership and team work. At the same time, a group of managers was generated who assisted by a labor psychologist, strengthened the agility of the interpersonal bonds, as also fomented improvement in individual performances. Having selected in the commercial strategy, to orient part of the product, to the scheme of North American norms (NHLA), it was defined to contract a certified classifier registered by this

organization so as to train managers, supervisors and workers. This action was carried out in two stages, an initial training one that lasted 3 weeks, and after 60 days the same instructor returned, to verify the correct functioning of the instructed guidelines. Another aspect that was contemplated as crucial to maintain the functionality of the plant was to obtain an extremely professionalized sharpened sector. For that purpose, the assistance of a professional sharpener from New Zealand was sought for, who during 2 weeks offered his training to supervisors and sharpeners. Also the sharpeners and supervisors were sent alternatively to do technical training at the CTM (Technological Wood Center – Montecarlo, Misiones, Argentina). In this establishment they received training in sharpening of chain saws and circular ones.

- Specifications: So as to have instructions which were clear and lasting of the products to be elaborated, engineering specifications were written up that eliminate all subjectivity and allows alignment of operative criteria. Among the elaborated specifications one can mention: log quality, cutting schemes, measures of sawn wood, measurement of small sticks, visual classifications of board qualities, putting together pack according to measure and destination (for example a 1x4" board to be used in construction, is put together in a different form in relation to the packages that are put together to enter dryers).
- Operative procedures: Knowing that the forest industry process activity is of high risk, and knowing that the personnel would be reduced, each one of the persons would have to act within the maximum conditions of safety not only for preserving his health, but also by the fact that each person, in the proposed management scheme, happens to be a specialist in his precise task. So as to agree and unify each team's operation criteria, committees were formed to write out the operative procedures which included the very persons who worked in the team. This involvement of the user himself in the writing committee itself, of each procedure, generated not only a richer material on the basis of experience, but also the personal satisfaction

associated to appear as an editor in the text itself. The writing out of operative procedures for the enterprise constitutes once again, a contribution towards the operative standardization of processes, since it regulates the activity and on the other hand it constitutes a fundamental tool to guarantee the management quality, of the workers themselves, as it is not possible to deviate from the guidelines established there. Logically that in virtue of being the first stage having to do with a management system, one aimed that these procedures integrated not only good practices from the operative matter, but also to the safety and personal hygiene and aspects to look after the environment.

- Audit of processes: Without speaking about an ISO management system, a random system of audits, were contemplated on processes and products, which allowed one to have a true situation status as to what was taking place. On the results of these audits, it was decided to reinforce the concepts of training the human resources involved, to eliminate the effects of the detected deviations. As from revision schemes like the present one, the necessity of putting together a matrix was detected, that summarizes the capacities or posts in which each worker was trained. Having this tool, allowed to reduce deviations in quality and productivity as also reducing accident risks. On the other hand in many cases one detected that some people needed different times for understanding, which sometimes included the need to train the same person more than once.

Destination Market - basic guidelines towards exporting:

It is known that the world-wide increasing demand for wood, without affecting the natural forests (large lungs of the planet such as the Amazon and the rest of the well-known tropical forests - or Rain Forests). The species at issue is a true alternative by its characteristics due to its characteristics of coming from plantations or cultivation. All negotiations with foreign markets, begin with quoting a price, where the business area of an export enterprise, makes calculations of values previously consulting the sawmill, so that

later to give to the client at the destination, a value for the product, put in the place where he determines it.

By a matter of regulations and reimbursement, sawmills quote prices FOB Buenos Aires:

FOB = Free On Board, is one of the terms most used in Argentina, it refers to the responsibility of costs to be assumed by the shipper that arrives, until positioning the freight on the ship.

Also and according to what the client determines, we can sell this same freight, using sales clauses or terms such as CIF, C&F or CFR, DDP.

The terms determine:

- Hat the price includes.
- When and where the transfer of risks on the goods, from the seller to the buyer, takes place.
- The place of delivery of the goods.
- Who contracts and pays the transport
- Who contracts and pays the insurance
- What documents each party transacts and their cost.

The terms are many, but the most used are:

FOB

- The seller's responsibility ends when the goods exceed the gunwale of the ship in the agreed embarkation port.
- The buyer must face all costs and risks of loss and damage to the goods from there on.
- The term FOB demands the seller to dispatch goods for export.

CIF

- To hand over the necessary goods and documents

- Packing and packaging
- Freight (from factory to the export place)
- Customs (documents, permits, requisites, taxes)
- Export Expenses (maneuvers, storage, agents)
- Freight and insurance (from export place to import place)

C&F or CFR

- Hand over the goods and necessary documents
- Packing and Packaging
- Transport (from factory to the export place)
- Customs (documents, permits, requisites, taxes)
- Export expenses (maneuvers, storage, agents)
- Freight (from export place to import place)

DDP

- Hand over goods and necessary documents
- Packing and packaging
- Transport (from factory to the export place)
- Customs (documents, permits, requisites, taxes)
- Export expenses (maneuvers, storage, agents)
- Freight (from export place to import place)
- Insurance
- Import expenses (maneuvers, storage, agents)
- Customs (documents, permits, requisites, taxes)
- Transport and insurance (import place to plant)
- Demurrage

Those are the clauses of sale terms, most used in lumber export.

Then we have what one refers to as tariff positions which each customs agent uses to carry out the export.

A Tariff position can be obtained from the Classification System and from applied Codification to designate as to the Customs' Tariff, the goods or groups of associate goods.

The position for the sawn Eucalyptus grandis wood is of 4409.20.00.000R, in which the first 6 digits are those that stay at International level, which correspond to the chapter and sub chapter of the tariff, the rest of the numerical codification belongs to each country.

The extract of tariff nomenclature 4409 considers timber (including small boards and for parquet frieze), outlined longitudinally (with tongue-pieces, grooves, beveled, V jointed, moldings, rounded or similar) in one or several faces, edges or backs. At the same time, the extension of the tariff nomenclature is distinguished in function on the type of wood to be commercialized that is to say:

440910 - Coniferous.

440920 - Different from Coniferous (Our case)

As to rates and taxes: The taxes (retention to exports), corresponding to these goods, are 5% on FOB value. In the same way, the Argentine state compensates through a reimbursement to the export of these goods, in a 4.05 % on the FOB value of that transaction.

Evaluation of the results:

Due to the fact, of having oriented this paper, within the context of "Operations Strategy", in the present report, the presentation of economic parameters, with the enterprise, will be omitted.

To the effects to suitably appreciate the management parameters, as a result of the financial year, the following summary table is enclosed in which the values up till May correspond to the ones obtained previous to the reengineering. From June (inflexion point) the values obtained as from said reorganization process, are presented.

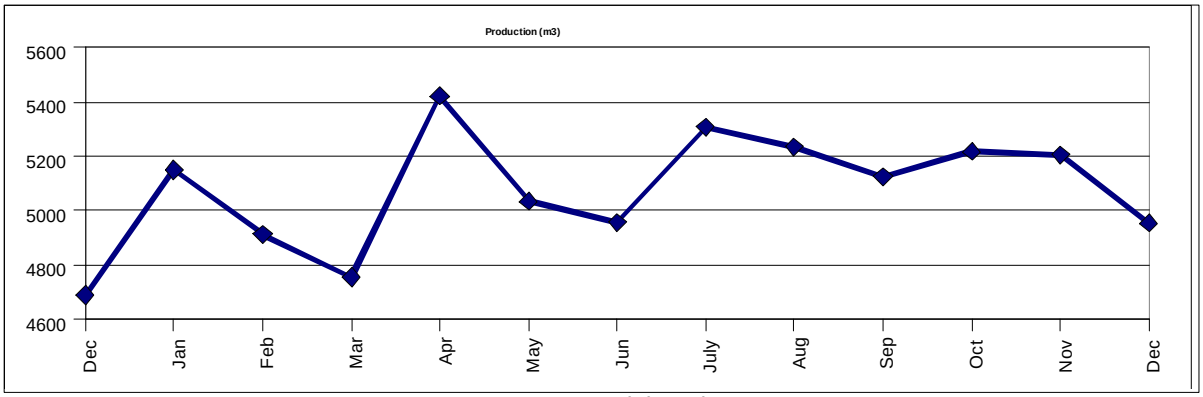
**Table 1.** Main management parameters.

| | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M3 Prod | 4689 | 5150 | 4912 | 4754 | 5422 | 5035 | 4956 | 5307 | 5234 | 5124 | 5218 | 5205 | 4953 |
| Personnel | 133 | 134 | 134 | 133 | 135 | 134 | 110 | 110 | 110 | 100 | 100 | 100 | 100 |
| Hours Worked | 182 | 194 | 168 | 198 | 192 | 194 | 196 | 192 | 188 | 194 | 196 | 194 | 184 |
| Man Hours | 24206 | 25996 | 22512 | 26334 | 25920 | 25996 | 21560 | 21120 | 20680 | 19400 | 19600 | 19400 | 18400 |
| $m^3$ Productivity | 0,19 | 0,20 | 0,22 | 0,18 | 0,21 | 0,19 | 0,23 | 0,25 | 0,25 | 0,26 | 0,27 | 0,27 | 0,27 |
| Sawmill Performance % | 46 | 45,5 | 47 | 46,5 | 47,2 | 48,3 | 48,8 | 49,2 | 49,5 | 49,3 | 49,3 | 49,5 | 49,6 |

**Source:**Own elaboration.

It is true that due to the effects of presentation of this paper, one shows values which represent a management year from point to point, the selection of this time interval, results more than prudent to the effects to show the result of the strategy of productive reorganization at which the enterprise at issue, reached. Additionally within this horizon the macroeconomic conditions of our country did not undergo significant alterations, thus transforming the temporary series, into a solid case of contrast from the actions taken as from the month of June. From the point of view of the obtained production volume, it is possible to appreciate it in Figure 2, that the magnitude of the oscillations between maximums and minimums was reduced as from the month of June:

**Figure 2.** Evolution of the production variable.

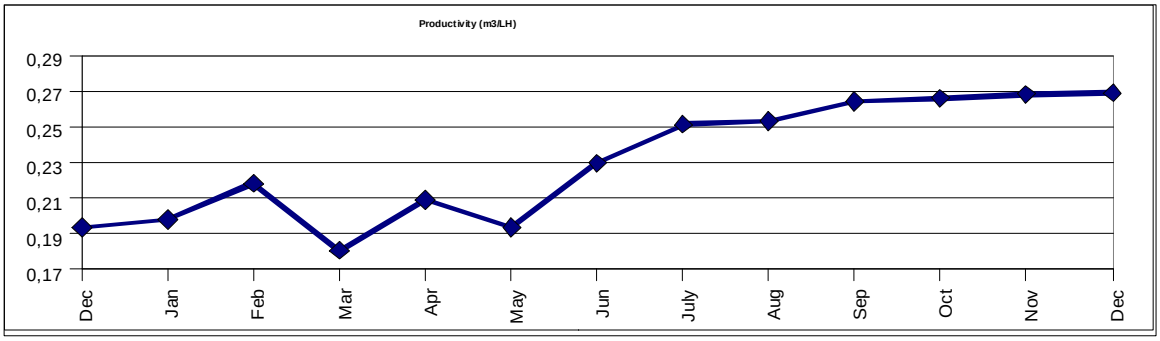



**Source:** Own elaboration.

On the other hand, the reconstruction effect and to obtain the stabilization of the volumes produced, on productivity, made possible an improvement of 30%, if the average values are compared before and after re-engineering. In this case one can also observe that the oscillations between precise values of a month, with respect to another one, have been reduced.

Figure 3, shows the parameters evolution.

**Figure 3.** Evolution of the productivity variable.



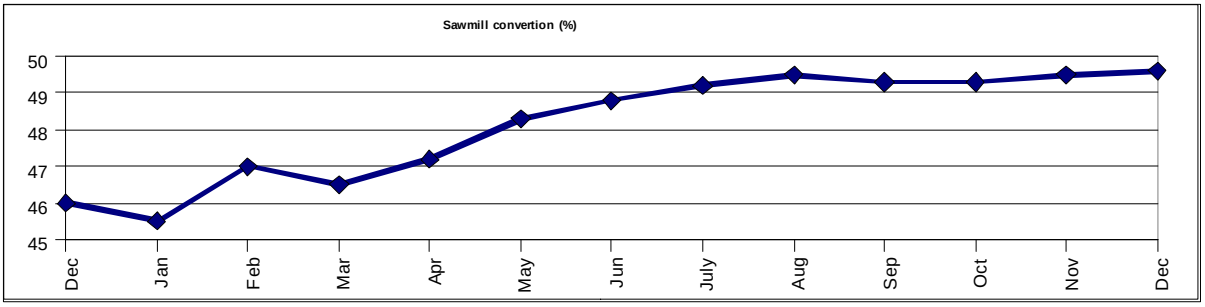

**Source** Own elaboration.

As a result of the redefinition of the measures to cut in the sawmill (the over dimensioning was reduced and the cutting tools changed to reduce sawdust production)

Another important aspect that contributed to obtain the improvement was the correct measurement of logs, as from the optical system including the debarked and log classification line.

This effect can be appreciated in Figure 4 that follows.

**Figure 4.**Evolution of the sawmill yield variable.




**Source:** Own elaboration.

## CONCLUSIONS

The contrast of the results is very clear obtained by re-engineering carried out in the analyzed enterprise.

In the development the sequence of the strategic steps approached by the enterprise, was presented, to manage to revert the results of the operations.

- Definition of markets
- Real possibilities of supplying with available raw material

- Selection of personnel or "Change Actors"
- Selection of control board parameters
- Training to sustain the change-innovation and competitiveness

It is possible to conceive that this logical sequence presented, be a scheme that the change managers had preconceived.

It would be interesting in other studies, to review application of this model in other enterprises, to corroborate if to a certain extent the same one, can be extrapolated.

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Please refer to articles Spanish bibliography.