THE BEHAVIORAL PROFILE OF HARVESTER OPERATORS[1]

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ABSTRACT – This study aims to characterize the behavioral profile of harvester operators, with the goal of assisting forest managers in selecting and training new teams of employees. A forest company located in central-western Brazil was examined from a sample of 20 harvester operators that did not have experience carrying out the functions of their industry. A behavioral profile evaluation tool was used, consisting of a management system that creates a profile based on behavioral competencies; it was initially used to develop a profile of a high-performing harvester operator; or rather, a reference profile. Next, the behavioral profile of the operators were grouped into distinct classes and compared with the reference profile to identify traits that could positively or negatively affect an operators' performance. An optimal profile had the following qualities: attentive to details, meets deadlines and follows rules, technically-oriented, patient with repetitive tasks, the ability to avoid conflicts, and being an introvert. An improper profile included aspects such as aggressiveness, being argumentative, being persuasive, explosive, and tense at work. The behavioral profile evaluation tool can support the process of choosing forest machine operators; however, it is important to also consider skills and work experience.

Keywords: Timber harvesting; Productivity; Selection.

CARACTERIZAÇÃO DO PERFIL COMPORTAMENTAL DE OPERADORES DE HARVESTER

RESUMO – Este trabalho objetivou caracterizar o perfil comportamental de operadores de **harvester**, visando auxiliar o gestor florestal na seleção, promoção e formação de novas equipes de trabalho. O estudo foi realizado em uma empresa florestal localizada na região Centro-Oeste, Brasil, a partir de uma amostra de 20 operadores de **harvester** sem experiência anterior na função. Foi utilizada uma ferramenta de avaliação de perfil comportamental, que é um sistema de gestão que caracteriza o perfil baseado nas competências comportamentais, utilizado inicialmente no desenvolvimento do perfil de referência do operador de harvester de alto desempenho. Em seguida, foi caracterizado o perfil comportamental dos operadores estudados, agrupando-os em classes distintas e comparando com o perfil de referência, de modo a identificar as características comportamentais que podem afetar positivamente ou negativamente o desempenho dos operadores na execução do trabalho. Os resultados mostraram que, os operadores com perfil adequado ao cargo apresentaram as seguintes características comportamentais: atentos aos detalhes, prazos e regras; tecnicamente orientados; pacientes com tarefas repetitivas; capacidade de evitar conflitos e introvertidos. Já os operadores de perfil inadequado tiveram comportamentos agressivos, argumentativos, persuasivos, explosivos e tensos no trabalho. O sistema ferramenta de avaliação de perfil comportamental poderá ser utilizado como ferramenta de apoio nos processos de seleção de operadores de máquinas florestais, porém, sendo importante considerar também a habilidade e experiência no trabalho.

Palavras-chave: Colheita de madeira; Produtividade; Seleção.

1. INTRODUCTION

In Brazil, wood harvesting mechanizations intensified in the 1990s with the importation of high-tech machinery into the domestic market (Parise, 2005; Lopes et al., 2010). This improved working conditions, increased production capacity, and reduced production costs (Minette et al., 2007; Leonello et al., 2012).

Parise (2005) claimed that a process is happening whereby there is a harvesting mechanization proportional to new high-tech equipment. However, Brazilian workers are not prepared to operate these machines, resulting in the need to hire competent people, which in turn led to the creation of the term "technological gap."

Purfürst (2010) noted that high-performing operators are the most valuable in a company because even if they are properly trained, there is no guarantee that they will perform well on the job. Pagnussat et al. (2014) said that a shortage of qualified professionals is the greatest challenge facing forestry companies implementing new technologies in timber harvesting.

Production capacity among experienced harvester operators can vary by up to 80%. In addition, during the hiring process, it is very hard to choose candidates with an appropriate profile to update operations with forest machines; it is therefore important to consider an individual's personal qualities (Purfürst and Erler, 2011). Buckingham and Clifton (2006) asserted that companies lacking professionals with the skills necessary to handle cargo and freight only reach 20% of their productive potential.

In terms of productivity differences, when comparing machines and humans, there is a variation of 20% to 50% during the training process of forest machine operators (Kärhä et al., 2004; Ovasikainen, 2005).

Lopes et al. (2008) reported that training operators with theory, simulations, and practice courses is more effective than operators who start to practice on machines when working alongside experienced operators. This makes it expensive to use the machines and reduces their mechanical availability, resulting in a greater risk of accidents and new employees learning inadequate work techniques.

Another important aspect that should be considered is choosing operators with a suitable profile for the position. If all individuals were equal and had the same traits conducive to learning and working, the selection process could be overlooked. People with different characteristics, behaviors, and abilities perform differently at work, mainly while harvesting wood. This task is characterized by great repetitiveness, and is carried out during different shifts with very complex, expensive machines.

Lopes et al. (2010) also observed that forest companies invest in a great amount of financial resources when training machine operators, who do not often have a proper profile, and end up leaving the load shortly after their training, thus compromising the entire planning process and generating high production costs.

In examining the skills and tacit knowledge of machine operators in the harvesting of wood, Parise (2005) maintained that workers can present the following characteristics: motor coordination, reasoning, planning ability, concentration and attitude, operational aspects, being productive, and executing quality operations.

In addition to the abovementioned characteristics, the notion of the behavioral profile – which is defined as an individual's natural predisposition for a particular kind of work – is highlighted. The behavioral profile is reinforced through brain connections (forming synaptic connections) throughout childhood, when people develop their natural talents. This makes it possible to predict a candidate's future performance; through exercise or training, an individual can demonstrate greater potential in a certain area, thus transforming talent into capacity (Buckingham and Clifton, 2006; Spector, 2012).

A behavioral profile leads to an individual's sources of motivation by identifying a function that drives him and determines his ability to perform or learn a particular task. If one's source of motivation is not compatible with his load, even if a worker has all the necessary skills and is fully capable of operating machines, the worker should not be considered qualified because he is not motivated to work, and ends up leaving to search for new opportunities (Buckingham and Clifton, 2006).

Volodina et al. (2015) and Parise (2005) argued that to improve the efficiency of forest operations and increase productivity, it is crucial to hire workers with tacit knowledge or natural abilities as well as the right personality, combined with sources of motivation. In this sense, this study aimed to summarize the behavioral

profiles of harvester operators so as to assist forest managers in choosing, promoting, and training new teams.

2. MATERIALS AND METHODS

The study focused on a forestry company in central-western Brazil, using a sample of 20 harvester operators with no previous experience. The human resources team chose them and the company trained them. The operators had an average age of 31 and had finished high school. They were trained through theoretical content, as well as in virtual reality simulator and field practices, with a total of 240 hours of workload.

Initially, the reference profile was developed using the behavioral profile assessment tool; this profile would be the ideal one necessary to carry out professional functions.

The behavioral profile evaluation tool is a graphic model that creates a profile of a high-performing operator based on his behavioral competencies. The graphic model covers all the individual's sources of motivation, which are assessed through the following factors: dominance, extroversion, patience, and formality.

A. *Dominance*: The "A" factor is lowered, and the individual has a greater tendency to avoid conflict and be accommodated; it evaluates the individual's desire to exert influence on people and events. The higher the "A" factor, the greater the tendency for the individual to be self-reliant, or rather, independent.

B. *Extroversion*: The lower the "B" factor, the greater an individual's tendency to be reserved and pensive; it measures the degree to which an individual interacts socially with others, including interpersonal relationships and communication. The higher the "B" factor, the greater an individual's tendency to be empathic and persuasive.

C. *Patience*: The lower the "C" factor, the greater the individual's tendency to possess a sense of urgency; it gauges the intensity of a person's energy, his level of tension, and rhythm regarding the type and frequency of work. The higher the "C" factor, the greater the individual's tendency to be patient, as well as an expert.

D. *Formality*: Assesses a person's impulse in terms of conforming to workplace rules, formality, structures, policies, guidelines, as well as their level of concern with details and quality at work. The higher the "D" factor, the higher a person's tendency to be concerned and compliant. The lower the "D" factor, the more likely it is that he will be informal and uninhibited.

Each harvester operator's reference profile was built based on research, with questionnaires from the behavioral profile tool applied during the interviews. The questionnaires were given to a group of managers, coordinators, and professionals of forest companies and universities with experience training forest machine operators.

The evaluation of the behavioral profile tool was applied to the operators in order to develop their behavioral profiles. The questionnaires were filled out in the workplace and without external interference. The analysis of the operators' behavioral profile was later performed using the behavioral profile evaluation tool.

After analyzing the behavioral profiles, the operators were grouped into different classes according to the affinity in the *sigma* fifths of the operators' profiles, who were interviewed. The classes were ranked based on the relationship with the job reference profile, as shown in Figure 1.

3. RESULTS

The Figure 2 illustrates the reference profile of a the behavioral profile of harvester high-performing harvester operator. The most desirable characteristics are: attention to detail, following timing and rules,
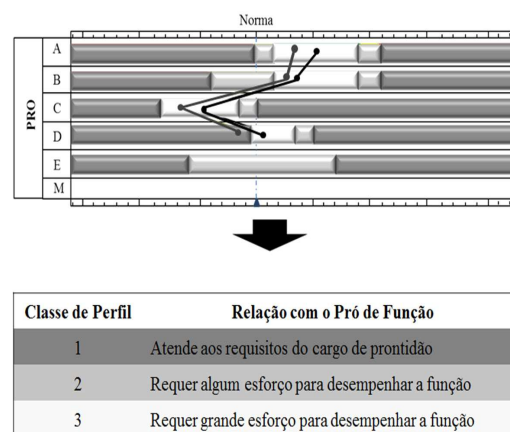

Classe de Perfil	Relação com o Pró de Função
1	Atende aos requisitos do cargo de prontidão
2	Requer algum esforço para desempenhar a função
3	Requer grande esforço para desempenhar a função

Figure 1 – Representative profile graph and relation with the classes ranked.
Figura 1 – *Gráfico representativo do perfil e relação com a classificação das classes.*

technically-oriented, patient with repetitive tasks, a tendency to avoid conflict, and being introverted. The dominant characteristics are described in detail below:

· *Focus*: The ability to perform tasks completely, with high standards of quality, accuracy, and a focus on details.

· *Rhythm*: The ability to perform tasks at a reasonable and steady pace.

· *Patience*: Stability while carrying out tasks and being methodical, with an ability to carry out develop predictable and repetitive tasks.

· *Extroversion*: Being a serious, introspective person without the need for constant communication and interaction with others.

· *Delegation and leadership*: The ability to perform tasks responsibly, able to think before acting and observe procedures established by the company, being a technical expert, and performing work as requested.

In general, an ideal operator must demonstrate that he is conscious and obedient and follows strictly established rules. Usually, such an operator might take more time to organize his thoughts and new ideas before expressing them, preferring to do one thing at a time. Finally, the operator can take part in decision-making, is practical, caring, and avoids risks while carrying out the work.

The classification of the harvester operators' behavioral profiles revealed three distinct subgroups of profiles when compared to the job requirements defined by the reference profile.

The behavioral profile graphs of class 1 (Figure 3), which represents 35% of the operators studied, is the best group to have fulfilled the the requirements of the position. The main characteristics obtained were: attentive to details, committed to deadlines, ability to avoid risks, adapts to repetitive tasks, patience, being introspective, and being technically-oriented.

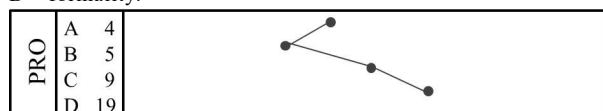* In which: A = dominance; B = extroversion; C = patience; And D = formality.

Figure 2 – Reference profile of the harvester operator.
Figura 2 – Perfil de referência do operador de harvester.

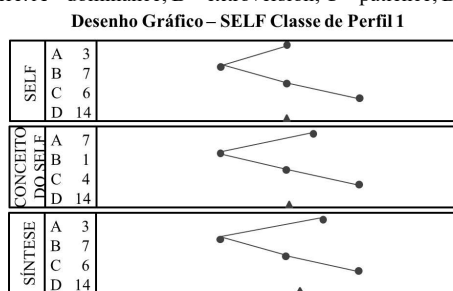Such operators have great decision-making skills, based on facts and not emotions.

The behavioral profile in class 1 showed that operators are able to follow the rules in detail, in addition to being comfortable following procedures and being supervised. This class presents characteristics such as the ability to execute what is expected of one's job with quality within a stipulated time period. Meanwhile, those who are conservative and reserved tend to be factual and cautious when communicating with other people at work.

The Figure 4 presents the operators' behavioral profile in class 2, representing 45% of the sample. The findings revealed the need for greater efforts to meet the requirements of a harvester operator position. The chief behavioral traits observed were: being careful with rules, formal, proactive, confident, communicative, and technically-oriented.

The behavioral profile of the operators in class 2 indicated that they are concerned about work, demanding about deadlines, disciplined, and reserved. However, they do not have patience with repetitive work, do not enjoy routines, and prefer to do tasks in a sequence, which makes them undesirable candidates.

The graph representing the profile of class 3 (Figure 5) comprised 20% of the participants. The analysis of the profile indicated the need for a lot

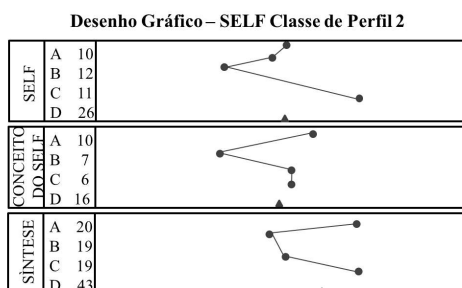Where: A = dominance; B = extroversion; C = patience; D = formality.

Figure 3 – Representative graphic of profile operators class 1.
Figura 3 – Gráfico representativo do perfil dos operadores na classe 1.

Where: A = dominance; B = extroversion; C = patience; D = formality.

Desenho Gráfico – SELF Classe de Perfil 2

Descrição dos Fatores:

D>C = Cuidadoso com regras / atento a prazos
D>B = Detalhista nos procedimentos operacionais
A>C = Proativo / impaciente com repetição
D>A = Tendência a evitar riscos com a máquina / cooperativo
B>C = Senso de urgência / menos reservado
A>B = Orientado tecnicamente / analítico

Maior intensidade

Menor Intensidade

Figure 4 – Graph representing the operators in profile class 2.
***Figura 4** – Gráfico representativo do perfil dos operadores na classe 2.*

* Where: A = dominance B = extraversion C = patience D = formality

Desenho Gráfico – SELF Classe de Perfil 3

Descrição dos Fatores:

A>C = Proativo / impaciente com repetição
A>D = Autoconfiante / impaciente com repetição
A>C = Extrovertido / empático
B>C = Senso de urgência / menos reservado
B>D = Não detalhista / desinibido
A>B = Orientado tecnicamente / analítico

Maior intensidade

Menor Intensidade

Figure 5 – Representative graphic of profile operators class 3.
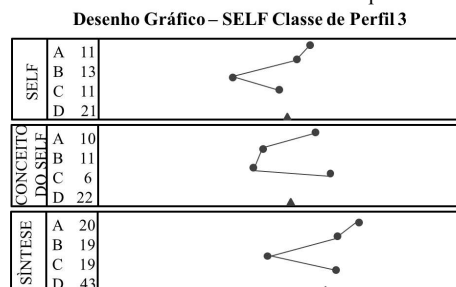***Figura 5** – Gráfico representativo do perfil dos operadores na classe 3.*

of effort to meet the requirements of the position. The primary qualities of the operators in this class were: being proactive, risk-taking, empathic, prone to anger and informal. The behaviors in this class showed operators with a dominant personality who work quickly, and who become impatient and unsatisfied when required to do repetitive, routine tasks. In addition, they easily and often take risks, resist authorities and rules, and prefer to do things their own way. They do not feel the need to follow the rules established by the company.

4. DISCUSSION

The behavioral characteristics expressed in the reference profile are necessary to perform well in the position. The main traits are related to technical orientation, attention to detail, and compliance with established deadlines. It is important to emphasize that such characteristics are linked to the quality and safety of the work, which the operator needs to carry out the tasks on time based on standards of quality and precision.

Patience is an important feature as it determines familiarity with predictable and repetitive tasks. However, although an individual should be very patient, the operator does not seem to express this quality too much; that is, patience is not the predominant behavior.

Patience must be expressed with moderate intensity so that extreme calm does not lead to a preoccupation with deadlines and production goals.

The operator must also be able to get along well with others, especially in terms of supervision. On the other hand, it is important for the operator to be a serious and introspective person since forestry work is performed in an individualized way, without interacting with other operators during the work. The operator cannot be an impulsive decision-maker, and must follow established procedures.

Finally, it should be noted that the behavioral characteristics in the reference profile relate directly to the company's requirements. The operator should be able to identify work areas and use established operating techniques, following procedures with safety and quality, as well as seeking to achieve greater productivity within an environment of cooperation and commitment.

The characteristics found in the reference profile are in accordance with the qualities defined by Ranta et al. (2004), who studied the tacit knowledge of harvester operators in Finland. They observed that a skilled operator is able to analyze factors that affect the operation, ensuring it is carried out as planned, avoiding risks, and without compromising productivity.

From the analysis of the profile of the operators studied, it was possible to identify some behavioral differences between individuals, who were grouped into three distinct profile classes according to the requirements of the position. It is important to note that the operators had already been interviewed and underwent several psychomotor tests when the company hired them, thus establishing a psychomotor pattern among them and limiting variation due to behavioral differences.

The operators of class 1 presented all the combinations of factors favorable to the position of harvester operator; that is, they had traits similar to those of the reference profile, altering only in relation to the proximity between the factors in the graph, which refers to the intensity of a behavior, or rather, how intensively the observed characteristics influence an individual's behavior.

The three graphs in Figure 3 were close to each other; hence, there is a perception of change among operators that they need to meet the requirements of the position, being this change small and easy to acomplish. According to Volodina et al. (2015), sources of motivation, combined with personality, make an individual more inclined to choose functions that have affinity with each other, thus making him increasingly skilled. In this way, even if a task has never been performed, because an individual has already developed skills needed for similar tasks, he now has superior performance. In this way, it is acceptable that in this class of profile, the operators present a superior development during the training period.

In class 2, the fact that the operators are more proactive and less patient in terms of the reference profile caused undesirable behavior for operating machines, since the operator demonstrated greater independence in decision-making with more pro-activity, which may lead one to perform a task in a way one understands and to not follow rules established by the company.

A lack of patience and fast pace are also qualities that can make an individual not adapt to repetitive tasks, thus generating discomfort and discontent with work. On the other hand, the highest number of factors evaluated were similar in relation to the reference profile and therefore facilitated an individual's adaptation to the position.

Finally, the operators of class 3 showed characteristics that were more distant in relation to the reference profile such as controlling behavior, being aggressive, explosive, and extremely impatient, differing significantly in relation to what is expected of an individual to fill the forestry machine operator position, mainly in terms of cutting with the harvester. This part of the job includes extremely repetitive tasks that require detail.

Hence, these traits indicated that the operator may have difficulties in following procedures, performing repetitive tasks, as well as a greater likelihood of generating conflict, machine breakdowns, work accidents, and loss of productivity, which would consequently increase production costs.

5. CONCLUSIONS

The most desirable behavioral qualities for a harvester operator are: being attentive to details, meeting deadlines and following rules, being technically-oriented, patient with repetitive tasks, the ability to avoid conflict, and being introverted.

The operators studied had differences in relation to the behavioral profile; these negative characteristics could affect the quality, safety, production capacity, and costs of wood harvesting operations.

The behavioral profile evaluation proved to be an efficient tool in people management, assisting in the selection and training of forest machine operators.

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