

Implementation of the ILUO training system in the San Francisco de los Romo industrial park

Implementación del sistema de capacitación ILUO en el parque industrial de San Francisco de los Romo

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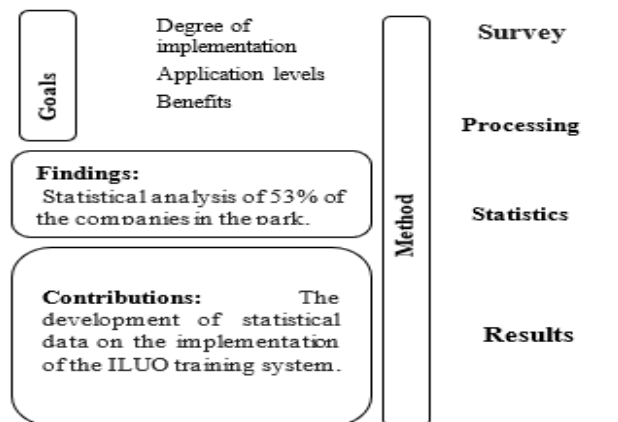
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Abstract

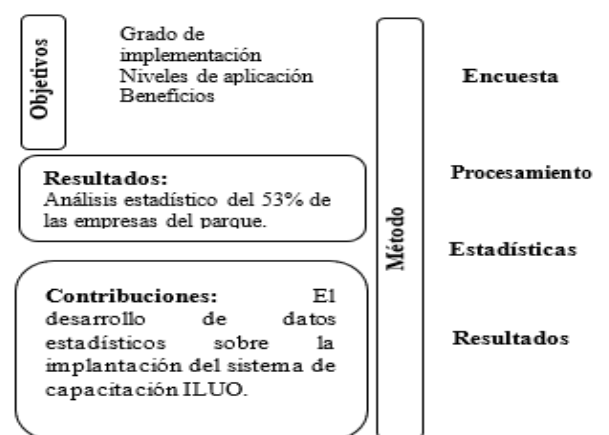
This research was carried out through an opinion survey about the ILUO matrix in the San Francisco de los Romo Industrial Park in the state of Aguascalientes, Mexico. The ILUO matrix is a tool that is used to evaluate the skill level of the operators who work in a company. The acronym ILUO represents the 4 skill levels to be measured. The objective of this work is to determine the percentages of companies that implement and do not implement this training system. At the same time, you will also be able to learn about the benefits that the ILUO matrix provides to companies that apply it in their facilities. All this in the San Francisco de los Romo Industrial Park. Some benefits that the ILUO matrix provides to companies are: Flexibility, Track progress, Continuous update and Efficiency

Resumen

Esta investigación se realizó mediante una encuesta de opinión sobre el sistema de capacitación ILUO en el Parque Industrial San Francisco de los Romo en el estado de Aguascalientes, México. El sistema de capacitación ILUO es una herramienta que sirve para evaluar el nivel de habilidad de los operarios que trabajan en una empresa. Las siglas de ILUO representan los 4 niveles de habilidad a medir. El presente trabajo tiene como objetivo determinar cuáles son los porcentajes de empresas que implementan y que no implementan este sistema de capacitación. A su vez también se podrán conocer los beneficios que les proporciona el sistema de capacitación ILUO a las empresas que si lo aplican en sus instalaciones. Todo esto en el Parque Industrial San Francisco de los Romo. Algunos beneficios que proporciona a las empresas el sistema de capacitación ILUO son: Flexibilidad, Seguimiento del progreso, Actualización continúa y Eficiencia



Training, ILUO matrix, Automotive Industry operator, Aguascalientes



Capacitación, Sistema ILUO, Operador Industria Automotriz, Aguascalientes

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Peer review under the responsibility of the Scientific Committee **MARVID**[®]- in the contribution to the scientific, technological and innovation **Peer Review Process** through the training of Human Resources for the continuity in the Critical Analysis of International Research.



Introduction

This research shows an analysis of the companies that apply the ILUO training system in their facilities and the benefits they obtain by implementing this system, as well as those companies that do not apply it. All this in the industrial park of San Francisco de los Romo.

A survey was carried out to analyse the implementation of the ILUO training system, here the necessary questions were formulated to contemplate the percentages of each question.

The companies where the use of the ILUO training system was contemplated show a series of benefits such as flexibility, progress monitoring, continuous updating and efficiency.

The results of the survey applied to a sample of 9 companies are shown below.

This project benefits the companies that do not apply this training system as they are made aware of the benefits that this system provides them and the possible improvements that ILUO would provide.

Methodology

According to Hernández Sampieri (2010) the study applied was a "Quantitative Exploratory" study using a survey type data recovery tool.

Sampling

The type of sampling was stratified.

The advantage of this type of sampling is that it tends to ensure that the sample adequately represents the population according to selected variables. It also makes it possible to obtain more precise estimates and its objective is to obtain a sample as similar as possible to the population as far as the stratified variable(s) are concerned.

The result was a sample of 9 companies out of 17 registered as automotive companies. This represents 53% of the companies that could be explored.

Box 1

Table 1

Automotive companies

Automotive companies in the San Francisco de los Romo Aguascalientes industrial park
• Advanced Composites
• Gestamp México SA de CV
• Resortes Monticello
• San-s Mexicana
• Beyonz Mexicana
• KTMex
• UNIPRESS
• Metalistik
• Sistemas de Arneses K&S Mexicana
• Sumimoto Electric Sintered Components
• Marelli
• Teklas Automotive
• SIMEPA
• SACRED Mexicana SA de CV
• Diagraph Itw
• Worldwide Design Alliance
• Manufacturas Plásticas y Metálicas Volvo

Background

The ILUO tool derived from the Lean Manufacturing Methodology that was implemented by TOYOTA in the middle of the 20th century is useful for industrial companies where production processes are carried out.

Companies in the automotive, aeronautical or metallurgical sector make use of this system because it helps them to manage the skill levels or professionalism of their workers.

The ILUO training system comes from the words: Innovation, Leadership, Union and Opportunities. It is an approach that was developed to provide training and development for workers and production teams that are focused on improving skills and techniques. ILUO therefore aims to maximise and achieve operational excellence. The history of ILUO is a clear example of continuous improvement because it is linked to the need to adapt to a constantly changing world of work, for this reason the skills that are practiced daily are no longer sufficient, so new competencies are required to succeed. The origin of ILUO can be traced back to the need for organizations to prepare their staff to face the challenges of the future. Thus, continuous learning is extremely important and essential in the competitive and constantly evolving business environment. The ILUO system has several key aspects, which are:

Innovation: Focused on the adoption of new ideas, technologies and approaches to problem solving and performance improvement. It also involves encouraging creativity and experimentation to drive progress.

Leadership: Recognizes the importance of developing leadership skills at all levels of an organization. It therefore includes skills in communication, decision making, change management and teamwork.

Partnership: Promotes collaboration and teamwork as fundamental elements for success.

Opportunities: It is based on seeking to provide development opportunities in order to adapt them to the needs of each individual. It therefore includes training in specific skills.

When implementing the ILUO system it can vary according to the organization and its needs. It therefore adapts to the circumstances of each company and also focuses on each of its acronyms (Innovation, Leadership, Union and Opportunity).

Over the years, ILUO has been in constant research and development to improve its effectiveness and applicability in different educational and informational contexts.

With regard to the application of the ILUO training system in the industrial park of San Francisco de los Romo, it is necessary to carry out a questionnaire in the area of human resources.

The area to be analysed is shown below:

Human Resources

The work of this area consists of the people in charge of training, when recruiting new personnel and even evaluating the aptitude of the workers who are already working in the facilities according to the position, they carry out certain activities to see the level of skill that each worker has and so they can determine the job position and even see if there can be personnel rotation. One of the tools used by some companies to evaluate the skills of the staff is the ILUO training system.

Results

The survey consists of 51 questions divided into 7 sections. From each area a number of questions were selected.

Section 1 General

Section 2 Levels

Section 3 Level I (General Assistant)

Section 4 Level L (Assistant Lubricator)

Section 5 U Level (Operator)

Section 6 O Level (Universal Operator)

Section 7 Benefits of the ILUO System

SECTION 1: General

67.7% of the companies surveyed in the San Francisco de los Romo Industrial Park use **the ILUO training system** in their facilities, while 33.3% of the companies surveyed do not implement this system.

Box 2

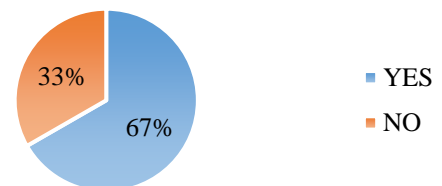


Figure 1

Implementation of ILUO training system

With regard to the surveyed companies in the automotive sector 55%.6% said that their company is large (with more than 250 people). While the other 44.4% said that their company is medium-sized (50-249 people).

Box 3

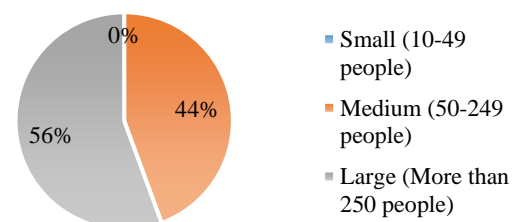


Figure 2

Magnitude of the companies

100% of the surveyed companies in the Industrial Park fully agree that all companies can use it.

Box 4

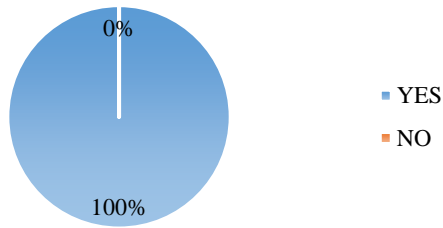


Figure 3

Companies that can use the ILUO training system

22.2% of the companies have been implementing this system for 5 to 9 years, while 33.3% have been implementing it for 10 or more years. The last 33.3% have never implemented it, while 11.1% have been implementing it for 1 to 5 years.

Box 5

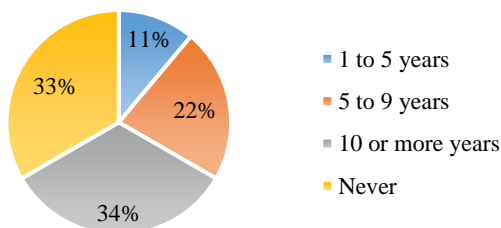


Figure 4

How long they have been implementing the ILUO system

With 100% full agreement, companies said that it is possible to measure skills with this tool.

Box 6

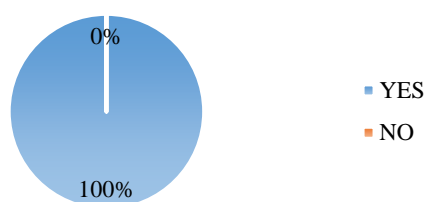


Figure 5

Ability to measure ability

Section 2: Levels

Only 77.8% of companies agree that the 4 levels are sufficient to measure the skill, however 22.2% disagree.

Box 7

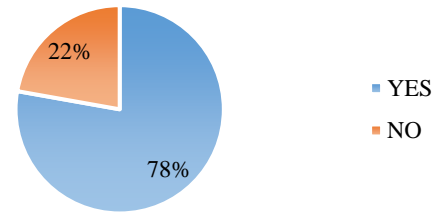


Figure 6

Sufficiency of the 4 levels of ILUO

Based on their respective facilities, 11.1% of the companies mention that the level with the highest ILUO skill level is level 1, 11.1% of the companies mention level 2. On the other hand, 44.4% mention level 3 and 33.3% say level 4.

Box 8

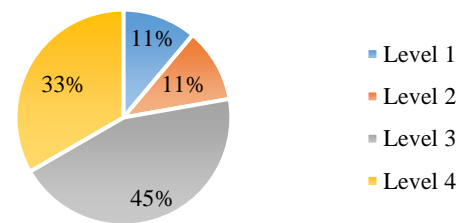


Figure 7

Level with greater capacity of the ILUO acronym corresponding to each company

77.8% of the enterprises have staff at level 1 (General Assistants). While 22.2% have no staff at this level.

Box 9

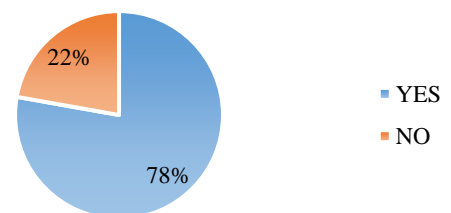


Figure 8

Level 1 staff

Of the companies surveyed, 55.6% mentioned that the percentage of level 1 staff in their facilities is 25%, while 44.4% mentioned that the percentage of level 1 staff is less than 25%.

Box 10

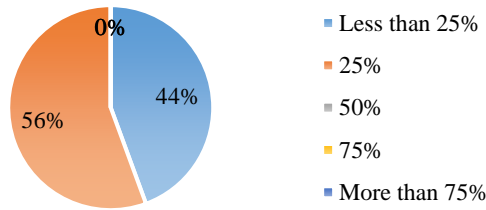


Figure 9

Personnel from companies with level 1

Of the companies that responded to the survey, 25% mentioned that the percentage of Level 2 staff on their premises is less than 25%. Another 25% of the companies mentioned that they have 25% of their staff with level 2. A further 37.5% say they have 50% and lastly 12.5% of the companies say they have 75%.

Box 11

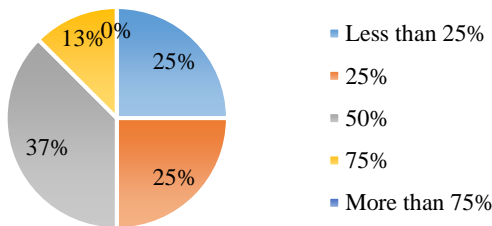


Figure 10

Personnel from companies with level 2

33.3% of the companies mentioned that they have less than 25% of staff with level 4, 11.1% of the companies have 25% of staff with level 4, another 22.2% have 50% of staff with level 4 and finally the other 33.3% of the companies have more than 75% of staff with this level.

Box 12

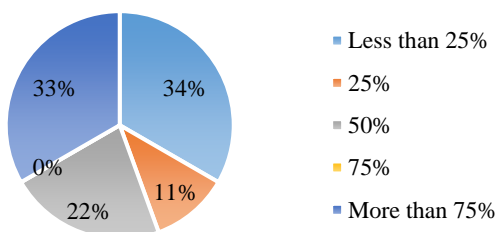


Figure 11

Personnel from companies with level 4

A worker fit to be a universal worker must have level 3 according to 55.6% of the companies, while 33.3% say they must have level 4 and 11.1% say they must have level 2 to be fit.

Box 13

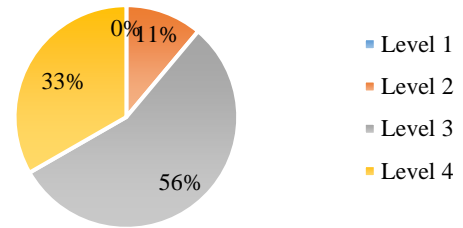


Figure 12

Level that an operator must have in order to be considered as a universal operator

Section 3: Level I (General Assistant)

100% of the companies state that the employee must attend the training programme for operational staff at the first level.

Box 14

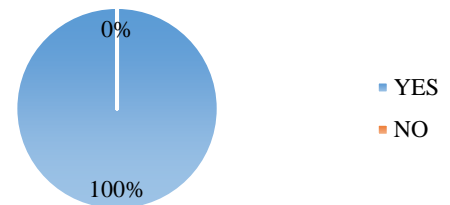


Figure 13

Attendance at the training programme for level 1

According to 77.8% of the companies, the time that the worker must have been in the company to be considered suitable for Level I is 3 months, although on the other hand, according to 22.2% of the companies, the operator must have been in the company for 1 month.

Box 15

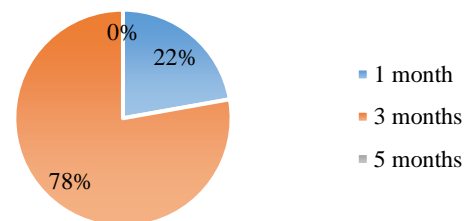


Figure 14

Time worked that a level 1 operator must have

According to the number of months that the operator has been working in the company at the time of the theoretical evaluation, the minimum average that the operator must obtain is 80 according to 55.6% of the companies, another average that the operator must obtain according to 22.2% of the companies is 90 and finally the other 22.2% of the companies say that the average must be 60.

Box 16

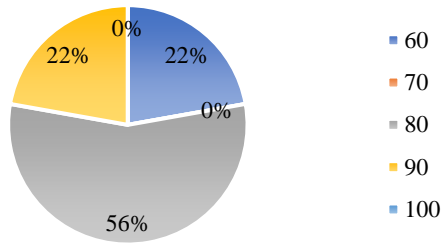


Figure 15

Minimum average that a level 1 operator must have

It takes the company 3 months to train staff to level 1 as 77.8% of the companies surveyed stated. The other 22.2% stated that it takes 6 months.

Box 17

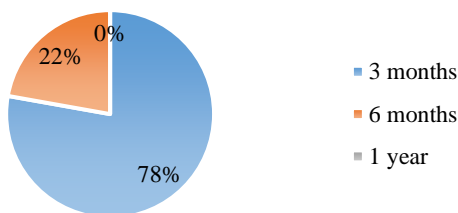


Figure 16

Training time for level 1

Section 4: Level L (Assistant Lubricator)

Of the companies surveyed 88.9% say it is absolutely true that level 2 operators should intervene in production processes, however 11.1% say it is false.

Box 18

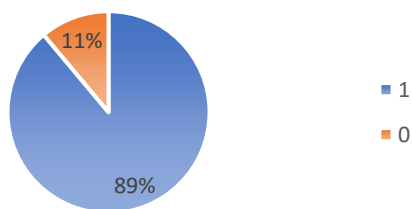


Figure 17

Operators intervening in the production process

In terms of the minimum percentage of machine knowledge that an operator should have, 11.1% of the companies said 100%. 33.3% of the companies said that the knowledge should be 90%, 33.3% of the companies said that the knowledge should be 80% and 22.2% said that the knowledge should be 70%.

Box 19

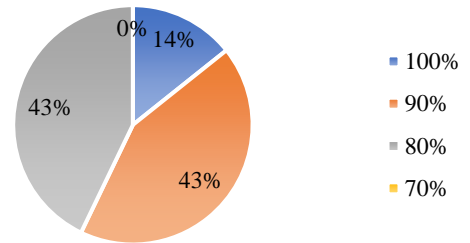


Figure 18

Minimum percentage of knowledge in handling machinery

In terms of the 5'S, 100% of the companies fully agree that operational staff should keep in their work area what they need to work.

Box 20

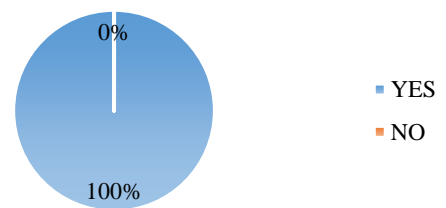


Figure 19

Application of the 5'S

The time it takes for companies to train operational staff at level 2 is 3 months according to 22.2% of the companies, 6 months according to 66.7% and more than 1 year according to 11.1% of the companies.

Box 21

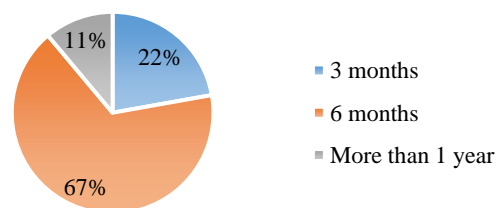


Figure 20

Training time for level 2

Section 5: Level U (Operator)

The percentage of companies that say it is true that operational personnel with level 3 can technically train level I and L operators is 77.8%, while 22.2% say it is false.

Box 22

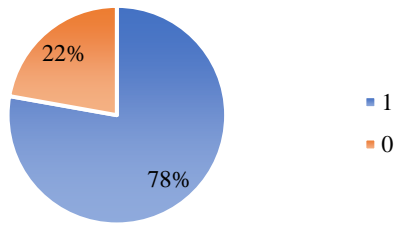


Figure 21

Level 2 personnel train level 1 and level 2

With a percentage of 100% of the companies, the companies mentioned that the operational staff should not have to pass any defect in the following process.

Box 23

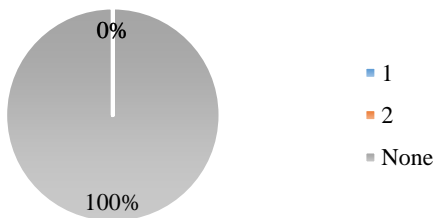


Figure 22

Level 2 zero-defect staff

At level 3 operators are trained to take initiative for continuous improvement with a percentage of 11.1%, for safety another percentage of 11.1% and 77.8% mention that it is for all of the above where continuous improvement, safety, quality and line compliance are included.

Box 24

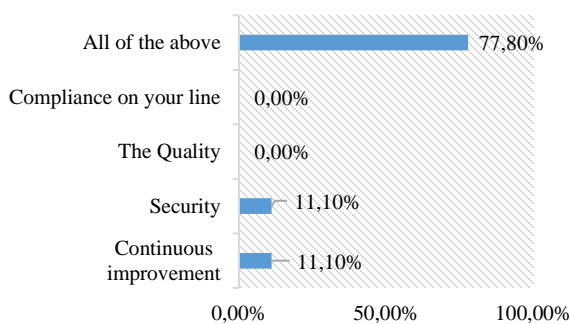


Figure 23

Reason for training for level 3

According to 66.7% of the companies do allow operators to contribute ideas to improve the standard and update their operation sheets, but 33.3% allow it on some occasions.

Box 25

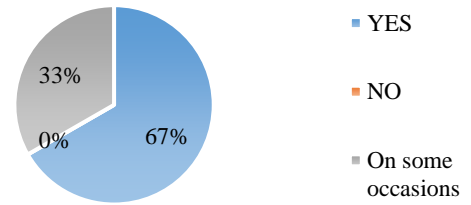


Figure 24

Permissions that level 3 personnel have

66.7% of companies take more than 1 year to train operational staff to level 3, 22.2% of companies take 6 months and 11.1% of companies take 3 months.

Box 26

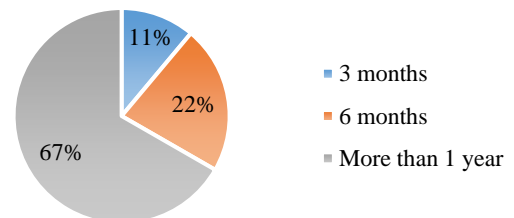


Figure 25

Training time for level 3

Section 6: Level O (Universal Operator)

Of the companies surveyed, 66.7% mentioned that it takes more than 1.5 years to train staff to level 4, 22.2% took 1 year and 11.1% took 1.5 years.

Box 27

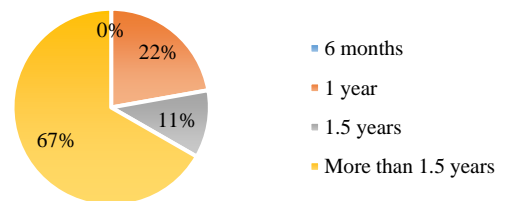


Figure 26

Training time for level 4

Section 7: Benefits

With regard to the benefits that the ILUO training system brings to the companies, 11.1% of the companies mentioned that it brings flexibility to their company, only 22.2% have had follow-up of the process, another 22.2% of the companies have had continuous updating, 11.1% have had efficiency, 66.7% have had all the benefits mentioned above, and finally 22.2% have had no benefits at all.

Box 28

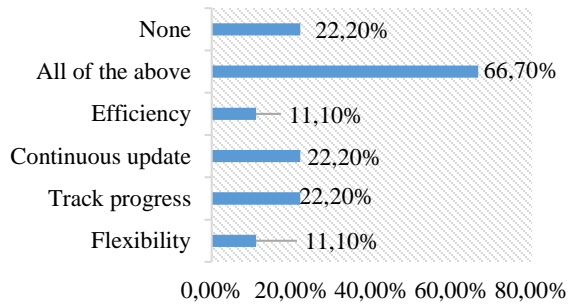


Figure 27

Benefits provided by ILUO

88.9% of the companies find it an easy tool to qualify the workers in their company, but 11.1% of the companies do not find it easy.

Box 29

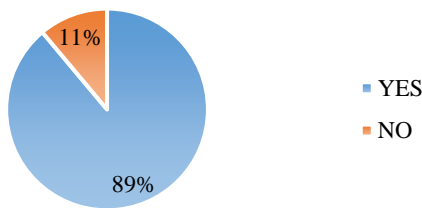


Figure 28

Ease of tools

Companies that use the ILUO format to easily see the skills of their staff are 55.6%. 44.4% do not use it.

Box 30

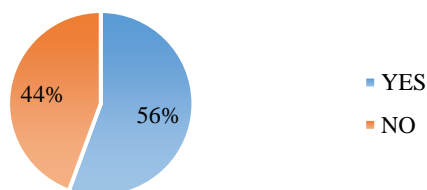


Figure 29

Companies applying ILUO

The percentage of accuracy that the ILUO training system allows them to track staff progress is 100% according to 33.3% of the companies that could be surveyed, while the other 33.3% of the companies say that the percentage of accuracy is 75%. Finally, the remaining 33.3% of the companies say that the accuracy rate is 50%.

Box 31

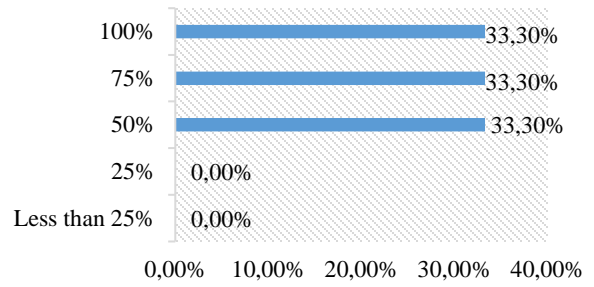


Figure 30

Track progres

66.7% of the companies mentioned that the implementation of the ILUO training system in their company does provide them with immediate feedback on the performance of their staff. 22.2% said that sometimes and 11.1% said that it does not.

Box 32

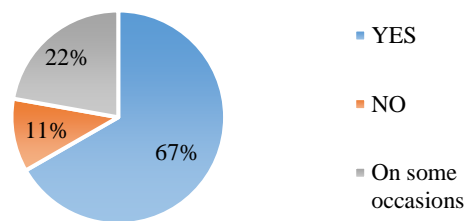


Figure 31

Immediate feedback

On the basis of whether the ILUO training system adapts to the individual needs and learning styles of workers 77.8% of the companies said yes, while 22.2% said no.

Box 33

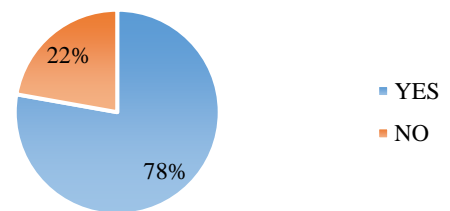


Figure 32

Individual adaptation of each operator

88.9% of the companies mentioned that the ILUO training system does allow them to rotate staff in their company, but 11.1% of the companies said that it does not allow them to rotate staff.

Box 34

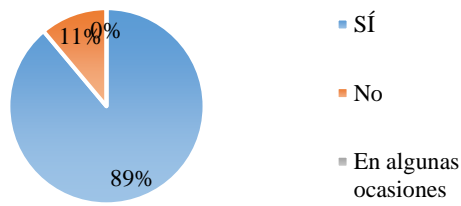


Figure 33
Staff turnover

44.4% of the companies say that the percentage that the ILUO training system has allowed them to optimize time and resources for workers and trainers is 75%. Another 44.4% of the companies say 50%, while 11.1% of the companies say a percentage of less than 25%.

Box 35

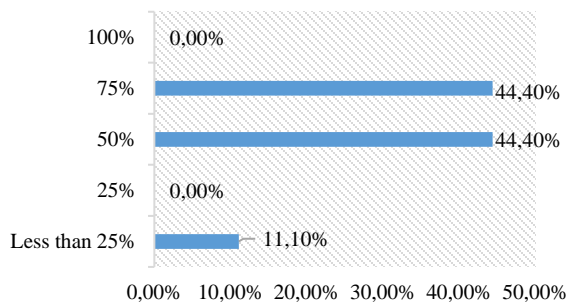


Figure 34
Optimizing staff time and resources

With 55.6% of the companies saying that the way in which the ILUO training system has enabled them to update and adapt easily to changes in the labour market is 75%, on the other hand 33.3% of the companies say 50%, while the remaining 11.1% of the companies say less than 25%.

Box 36

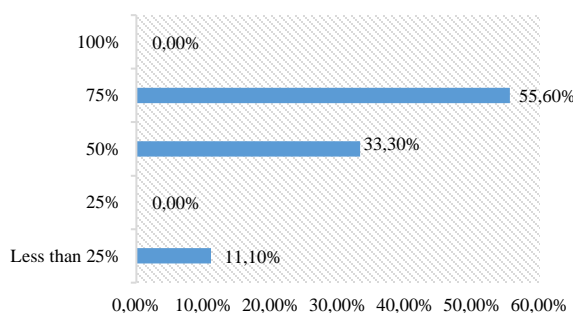


Figure 35
Updating and adapting to changes

Based on the companies that do not implement the ILUO system. The percentage of 33.3% of the companies believe that they can improve production by 50% if they implement it. 22.2% of the surveyed companies believe that they can improve with 100%. Another 22.2% of the companies think that they can improve with a percentage of less than 25%. 11.1% of the companies think they can improve with 75% and the remaining 11.1% say they can improve with a percentage of 25%.

Box 37

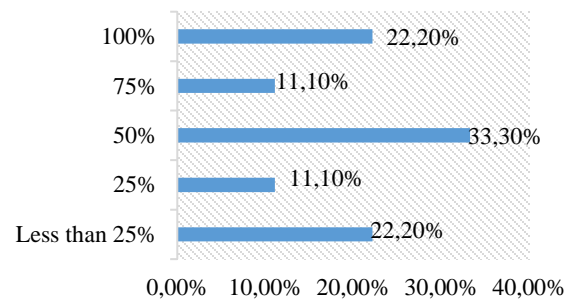


Figure 36
Possible improvements

22.2% of the companies surveyed mentioned that the competitiveness provided by the ILUO training system can be 100%. On the other hand, 11.1% of the companies mentioned that the competitiveness could be less than 25%. 33.3% mentioned that it could be 50%. The remaining 33.3% mentioned that if they implemented this system in their facilities, the competitiveness they could obtain could be 75%.

Box 38

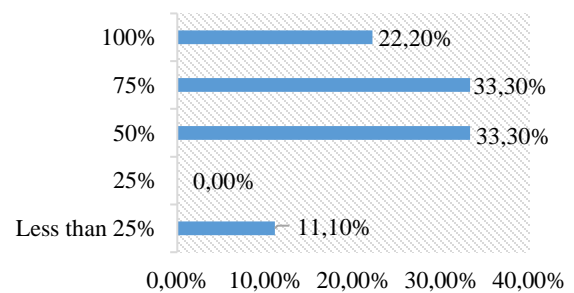
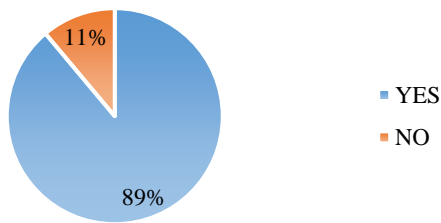


Figure 37
Competitiveness enabled by ILUO

The percentage of companies agreeing that the ILUO training system can achieve operational excellence is 88.9%. 11.1% do not agree.

Box 39**Figure 38**

Operational excellence provided by ILUO

Conclusions

The ILUO training system is known by most of the companies in the automotive sector to which the survey was applied, with a percentage of 88.9%. Most of the companies are large, with more than 250 people working in their facilities. However, it should be taken into account that this system is only implemented in 66.7% of the companies in the San Francisco de los Romo Industrial Park, although all the companies are capable of using it. However, 64% of the companies have been implementing this system for 10 years or even more. With this, all companies assured that the ILUO training system can really measure the skills of the staff, as well as it can be applied frequently in the company premises.

Based on the 4 levels corresponding to the ILUO acronym, 77.8% of the companies agree that these 4 levels are sufficient to measure the ability of the staff. Each company has a completely different level of maximum ability, but the majority of companies (44.4%) have assigned level 3 (letter U) as the highest of all levels. The majority of the companies claim to have level 1 staff in their facilities with approximately 25% of the operators being at this level. A level 3 operator is worthy of being a Universal Operator, as mentioned by 55.6% of the companies. Finally, more than 75% of the staff in most companies are at level 4.

Operational staff with level 1 must compulsorily attend the training programme. Thus, in order for a worker to be considered level 1, he/she must have been working in the company for 3 months, as mentioned by 77.8% of the automotive companies. During that time they have been working, they must obtain a minimum of 80% of correct answers in the theoretical assessment. It takes 77.8% of the companies approximately 3 months to train staff at this level.

Operational personnel at level 2 are involved in production processes, or at least this is what 88.9% of the companies mentioned, and they must also have a capacity of 80% to 90% of knowledge in the handling of machinery. Similarly, at the time of work, they must maintain in their work area what is necessary to be able to work applying the 5'S methodology and at the same time they must not make mistakes in their work, and they must also comply with zero defects to the client. It takes 66.7% of the companies 6 months to train level 2 operational staff.

Personnel with level 3 are able to train operators with level 1 and 2, 77.8% of the companies said so. Operators with this level have a very big responsibility because they cannot pass any defect to the next process and this leads them to know the critical points of their operation. Most of the companies that responded to the survey mentioned that level 3 operators are trained to take initiative in various aspects such as continuous improvement, safety, quality and line compliance. Companies allow workers at this level to contribute ideas to improve the standard and update their operation's sheets. Training for level 3 takes more than 1 year according to 66.7% of companies.

Operators with level 4 can train levels 1, 2 and 3. Training for this level takes more than 1.5 years according to 66.7% of the companies.

By implementing the ILUO training system in the industry, it provides certain benefits such as flexibility, progress monitoring, continuous updating and efficiency in the company. As a result, this tool allows for easy qualification of personnel. Therefore, 55.6% of the companies use the format to visualize the skills of their workers. ILUO allows to track the progress of the personnel with a percentage of 50% to 100% and also provides immediate feedback of the worker's performance. This system allows the company to choose the area in which the worker will perform best and at the same time adapts to the individual needs and styles of the workers, as 77.8% of the companies ensure this. The majority of the companies mentioned that the ILUO training system allows staff rotation, optimizes time and resources for workers and company instructors from 50% to 75%, as 44.4% of the automotive companies stated.

55.6% of the companies agree that this system allows updating and adapting to changes in the labour field with an ease of 75%. Thus, ILUO allows to eliminate 50% of downtime and also allows to have a competitiveness of 50% to 75% as mentioned by the majority of the companies. Furthermore 88.9% of the companies agree that ILUO can achieve excellence and can also improve production with a percentage of 50% effectiveness.

Recommendations

There could be a reduction in the time it takes for operators to move up a level. Normally the time they give operators to train them is time they are not spending on productive tasks. This makes companies see this as a loss of productivity. Most companies are under pressure to meet targets, which can put training on the back burner. By devoting more time to staff training, operators would become multi-skilled which would allow for staff turnover, thus increasing the company's production.

When implementing the ILUO training system, it is recommended that constant follow-up is given, so that immediate feedback can be given and accurate data on the operational staff can be obtained. This will make it easier for the company to choose the right area for each operator according to his or her skills in relation to the position.

Continue with the training activities according to the company so that the personnel in charge of the training can apply them to the operative personnel, regardless of the level of each worker, so that when interacting with the activities, tools and machines, the same operative personnel with a higher level can give feedback to operators with a lower level. Similarly, the company can encourage its workers to continue with their studies, give them scholarships to obtain a university degree or TSU, with this they would have more knowledge that would benefit the company and even the workers themselves, as they could obtain a better position in the company. With the survey that was carried out, it is clear that some companies do not know the ILUO training system, which means that the companies do not have adequate training and cannot apply continuous improvement in their facilities. Courses could be held in the companies, especially in the area of training.

Declarations

Conflict of interest

The authors declare that they have no conflicts of interest. They have no known competing financial interests or personal relationships that might have appeared to influence the article reported in this article.

Authors' contribution

Rivas-Castorena, Britney Daniela: Contact of personnel of the companies selected to answer the survey. Editing the document.

Vázquez-Gutiérrez, Rosa Inés: I contributed in the selection of the topic, supervision and support in contacting personnel of the companies selected to answer the survey. Supervision and explanation of how to edit the document.

Núñez-Montalvo, Juan Manuel: Support in the revision of the document

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Article

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