



IDENTIFICATION OF EIGHT ERGONOMIC ASPECTS FOR ACCELERATION OF THE IMPLEMENTATION OF HALAL ASSURANCE SYSTEM (HAS)

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Abstract

The implementation of the Halal Assurance System (HAS) is one of the requirement that must be met by companies that will apply for halal product certification to the legal halal certification institution in Indonesia. Industrial Halal Assurance System (HAS) must meet the criteria as stated in the HAS-23000 book. Industrial management must create and implement halal Assurance System (HAS), which consists of eleven HAS criteria. This halal guarantee system will be a maintained document to ensure the consistency of halal industrial products. However, to date the industry that has obtained halal certificates for products has not been maximized in maintaining and improving the HAS manual, so a more ergonomic approach is needed to humanize humans from the systems and rules that are implemented. The method in this study is rapid monitoring (rapid appraisal method) criteria and participatory methods (participatory method) in the implementation of eleven HAS. The sample in this study was 197 cake and bread industries that have been audited by LPPOM MUI Banten and have received halal product certificates. The results showed that from the identification of eight ergonomic aspects could improve the performance of industry, those are: aspects of energy/nutrition, musculoskeletal, Body Posture potentially accelerate the implementation of the criteria of the halal management team, training, halal policy, environmental aspects potentially accelerate the implementation of the criteria of materials handling, products, c) aspects of time condition, socio-cultural, information potentially accelerate the implementation of the criteria of critical activities, traceability, products handling that do not meet the criteria, internal audit, and management review, d) Human-Machine Interface aspects potentially accelerate the implementation of the criteria of production facilities.

Keywords: Ergonomics, Halal Assurance System (HAS), Cake and Bread Industry



1. Introduction

The demand to meet the eleven criteria of the Halal Assurance System (SJH) for the industry is a must that must be done and maintained and monitored regularly. This system guarantees that production processes or facilities, raw materials, and finished products are free from prohibited contaminants and should not be mixed. During the validity period of the halal product certificate, the industry is obliged to send the implementation of the existing system in the industry to the local LPPOM MUI periodically for 6 months. In addition to being an industrial management obligation, it also aims to provide assurance that the company continues to implement an internal control system so that the halal of the product is maintained. Thus consumers feel safe and comfortable with the products consumed. The system implemented must refer to the 23000 Halal Assurance System (HAS) issued by the Food and Drug Research and Cosmetics Research Institute - Indonesian Ulema Council (LPPOM MUI). Non-compliance with guidelines, procedures and policies that exist in the company with existing standards will affect the status of the halal guarantee system (SJH) in the company. The status of SJH consists of A, B and C. A company's product can be halal certified if the company's halal guarantee system (SJH) status has a minimum criteria of B.

Companies that have obtained halal product certificates are required to implement and develop an industrial halal assurance system (HAS). Until now, the implementation of the HAS in several industries still needs improvement and assistance. This condition is caused by the company not yet having an understanding of the HAS in accordance with HAS-23000 criteria and procedures. In addition, the implementation of HAS in the company has not been in favor of humans or workers, those are the fulfillment of procedures is still top-down, so workers could not understand and run HAS optimally and the company has not used workers in running and developing an internal halal assurance system of the company. Therefore a mechanism for implementing human-based HAS is required.

The implementation of this system is important as part of consumer protection (Hasan, 2014; Hata, 2006), because many products are still not halal certified (Sidabalok, 2010; Sofie, 2008), there needs to be a differentiation between products that are already certified and those that are not certified.

Ergonomic science offers the concept of humanizing humans, so workers in industry are considered as "human capital", workers should be involved from the beginning of the SJH implementation process. Policies implemented by the company should be known and implemented jointly by all workers, especially in critical departments. There is no common understanding among employees of the eleven SJH criteria, so the implementation of HAS has not become a culture within the company.



Eleven criteria in HAS that must be implemented by the company are: the company has a halal policy, the company must have a halal policy management team, the company management must conduct periodic training and education on the concept of halal, the company must have criteria about halal and non-halal materials, companies are required to know the criteria for products that can and cannot be certified. The company must have facilities that are free from halal pollution. The company must have written procedural criteria for production activities in critical condition. The company must have a traceability system. That is, the basic ingredients of the products produced can be traced halal, companies must have procedures for handling products that are not halal. The company must have an internal audit team to conduct the evaluation at least once every six months and the results of the evaluation are reported to LPPOM MUI (Susihono, 2018), and the company must conduct a management review or review management at least once a year. Until now, the ineffectiveness of the implementation of the halal industry system is caused by the involvement of humans or workers in the company internally not being optimized. The purpose and implementation of the implementation is merely a process, not yet making improvements rest on humans. Standard Operating Procedure (SOP) is still based on the process, not based on ergonomic human factors. Repair and development of existing systems within the company becomes slow, even in some periods there is no development. This condition, if left unchecked, will have an impact on the implementation of the HAS implementation which is only procedural, not yet culture oriented.

In the concept of applying ergonomic science, at the beginning of repairing a system it is advisable to pay attention to worker factors. Workers are the main factor in improving the system. Humans are not an object but as a driving subject, a major consideration of every system implementation. In order to get an idea of what systems need to be developed, ergonomic integration in accelerating the application of halal guarantee (SJH) systems in the industry needs to be done. Various problems can be mapped through eight aspects of ergonomics ranging from aspects of energy / nutrition, aspects of musculoskeletal complaints, aspects of Body Posture, environmental aspects, time condition aspects, socio-cultural aspects, information aspects, and Human-Machine Interface aspects. From these eight ergonomic aspects, then human resources can be mapped which can run the system leader or sub system leader. Workers have their respective roles but one goal is complementary. Humans have different abilities, but the burden on fulfilling the system can be divided according to their proportions and characteristics. It is expected that workers are not over-working or under-working, because both of these are problems in ergonomics.

2. Research Method

The study used a qualitative research method of rapid monitoring (rapid appraisal method) and participatory methods (participatory method) of the implementation of eleven HAS criteria. Qualitative research is used to investigate, discover, describe, and explain the effect of implementation of halal assurance systems in the industry. Based on the eleven criteria of the Halal Assurance System in (HAS-23000), the sampling of data sources was done purposively and snowballed, collecting techniques with tri-grading, data analysis was inductive or qualitative, and the results of qualitative research emphasized the meaning of the implementation of HAS on industry. The sample in this study was 197 cake and bread industries that have been audited by LPPOM MUI Banten and have received halal product certificates.

Eight ergonomic aspects include: a) energy / nutrition aspects, b) musculoskeletal aspects, c) Body Posture aspects, d) environmental aspects e) time condition aspects, f) socio-cultural aspects, g) information aspects, h) Human- aspects Machine Interface.

Whereas the eleven criteria of the Halal Assurance System (HAS) include: a) Halal policy, b) Halal management team, c) Training and education, d) Materials, e) Products, f) Production facilities, g) Written procedures for critical activities, h) Search capabilities, i) Handling of products that do not meet the criteria, j) Internal audit, k) Management review.

3. Results And Discussion

3.1 Characteristics of a Halal certified company (bread and cake industry)

From 197 bread and cake industries that have been audited by LPPOM MUI Banten and have obtained halal certificates, the characteristics of the products can be seen showing that each year experiences different fluctuations.

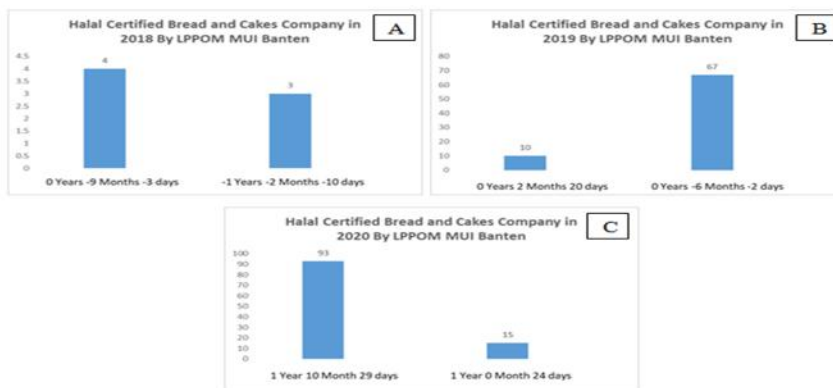


Fig 1. Comparison of the validity period of halal certificates in the bread and cake industry annually which is certified by LPPOM MUI Banten.



a) In 2018, halal certificates with an average validity period of -9 months are 4 halal certificates, and -1 years for 2 certificates halal; b) In 2019, halal certificates with an average validity period of 2 months are 10 halal certificates, and as many as -6 months as many as 67 halal certificates, c) In 2020, halal certificates with an average validity period of 1 year are 108 halal certificates.

3.2 Eleven criteria for the Halal Assurance System (HAS)

a) *The company must have a halal policy.*

Halal policy must be disseminated to all stakeholders including management, halal management team, workers, suppliers. Dissemination mechanism can be in various ways according to company needs, including: training, briefings, internal memos, bulletins, banners, e-mails, banners, posters. Until now the measurement of the implementation of halal policy needs to be reviewed again because some companies do have a halal policy, but the content is still public and not easily understood by all stakeholders.

b) *The halal policy management team.*

A group of people appointed by top management as the person responsible for planning, implementing, evaluating and continuously improving the halal guarantee system in the company. Top management must establish a halal management team through a decree and time frame. The head of the halal management team is predominantly Muslim. The responsibilities of the team are clearly defined. The halal management team includes all sections involved in critical activities. The Halal Management Team understands the requirements (HAS 23000) according to their respective responsibilities. So that external training is needed in order to equalize perception. The Halal Management Team Coordinator is at least a Technical Manager. The Halal Management Team can be at the corporate or holding level or in factories, outlets, warehouses and kitchens. Determination of team responsibilities can be written separately or integrated with other systems. Top management must provide the resources needed for planning, implementing, evaluating and continuously improving the halal guarantee system which has become the company's internal commitment.

c) *Conduct training and education on halal concepts.*

The company has written procedures for conducting training for all personnel involved in critical activities, including new employees. The procedure for conducting training includes goals, targets, schedules, participants, methods, material providers, documentations, evaluations and graduation indicators. The training material includes halal certification requirements (Criteria, Policies and Procedures in HAS-23000) and is adjusted to the training objectives. External training is training on HAS 23000 (halal certification requirements) with trainers from LPPOM MUI, either organized by LPPOM MUI or by companies in the form of in-house training. External training is carried out at least every two years



or more often if needed. Internal training must be carried out on a scheduled basis at least once a year or more often if needed. Training must include graduation criteria to ensure competency of personnel. The indicator of internal training graduation is that each participant understands their responsibilities in the implementation and continuous improvement of the halal guarantee system. Evaluation of graduation can be done through written tests, oral tests or other forms of evaluation that apply in the company. Evidence of the implementation of the training must be produced and maintained

d) Have criteria about halal and non-halal materials.

All Raw Materials and Supplementary Materials must be registered, all ingredients used to produce the product and become part of the product composition (ingredient). With regard to Auxiliary Materials, Ingredients are used to help manufacture products, but these ingredients do not form part of the product composition (ingredient). Ingredients must not be derived and contain ingredients from: pigs and their derivatives, alcoholic drinks, derived from only derived physically, Blood, carcasses, parts of the human body, Material not produced from production facilities that are also used to make products using pigs or their derivatives, the ingredients do not mix with unclean or unclean ingredients. Animal material must come from halal animals. The type of animal that must be slaughtered must be proven to be slaughtered according to Islamic sharia. All marine animals are halal, both life and carcass. Microbial Product Requirements include: a) The product does not cause infection and intoxication in humans, b) growth media, additives and auxiliaries do not contain ingredients derived from pigs or their derivatives, c) For microbial products obtained without separation from the growth media, then the growth media must use material that is sacred and lawful. Microbial products obtained by separating from growth media using unclean and unclean materials other than pigs and their derivatives must be washed according to syari'ah rules. Whereas microbial products that use recombinant microbes may not use genes from pigs or humans. Material from pigs and their derivatives must never be used in halal production.

The company must have supporting documents for all materials used. Supporting documents for all materials used must be valid. Material supporting documents can be halal certificates, process flow diagrams, technical specifications, MSDS, CoA, statements of pork free facility or a combination of several documents issued by the manufacturer. Every new material must obtain LPPOM MUI approval. Proof of approval of new materials must be maintained. Halal production can only use approved material. Material that has the potential / possibility of being produced in the same facility as material from pigs or their derivatives, must be accompanied by a statement of pork free facility from the producer. The company must have procedures to guarantee that all supporting documents used are always valid.



e) *Know the product criteria that can and cannot be certified.*

Products are the registered products for Halal certification, both in the form of end products and intermediate products. For products in restaurants, all menus that are served, either made by the company or menus purchased from other parties or consignment menu (deposit) must be listed. Product names do not use names that refer to something that is forbidden or worship that is not in accordance with Islamic Law. Characteristic or Sensory Profile Products do not have a tendency to smell or taste that leads to illicit products or that have been declared haram based on MUI Fatwa. Especially for retail products. If a particular brand is registered, then all product variants with the same brand must also be registered. If the product has a formula, then the standard formula must be made and documented. Especially for restaurants, all menus must be registered. Restaurants must make special rules that prohibit visitors from consuming products from outside. If there is a birthday event in the restaurant, then the cake used must be halal certified. If there is no halal certificate, then the tart can only be cut and photographed but not consumed in the restaurant. Likewise, prizes in the form of food or drinks are distributed to event participants as prizes. Non-Certified Product Names include the name of the liquor, the name of pigs and dogs and their derivatives, the name of the devil, the name of the product that refers to things that cause sleaze, product names that contain words that have an erotic, vulgar or pornographic connotation.

f) *Having facilities that are free from things that pollute halal matters.*

Production Facilities are all production lines and auxiliary equipment used to produce products, either self-owned or rented from other parties. All names and addresses of production facilities must be registered. Production facilities may not be used interchangeably to produce halal certified products and uncertified products containing ingredients from pigs or their derivatives. Material and product storage facilities, including intermediate warehouses, must be able to prevent unclean contamination. The procedure for sampling materials and products must be able to prevent unclean contamination. Equipment washing facilities may not be used together or alternately with equipment that comes in contact with material originating from pigs or their derivatives. Halal production is only allowed in production facilities that meet the criteria. Facilities are used together to handle products that are certified with products that are not halal certified. Special requirements for this facility are that there is no use of pig material and its inheritance and there are adequate application of washing procedures.

g) *Have written procedural criteria for production activities in critical condition.*

Written Procedure Critical Activity is a set of work procedures that are standardized to control critical activities. Critical activities include the selection of new materials, purchase of materials, product formulation, inspection of



incoming materials, production, washing of facilities and auxiliary equipment, storage and handling of materials or products as well as transportation. The written procedure for critical activities must be socialized to all parties involved. The written procedures for critical activities must be evaluated for effectiveness at least once a year. The new material selection procedure must guarantee that all new materials must go through the stages of approval for their use by LPPOM MUI except the ingredients in the positive list. Proof of new material selection must be made and maintained. The company must have a purchasing procedure. The procedure must guarantee that all materials purchased for certified products are approved by LPPOM MUI. Material purchases can refer to the list of materials approved by LPPOM MUI. The company must also have a formulation procedure, the procedure must guarantee that all materials used have been approved by LPPOM MUI. Standard formula must be available. The company must have a written procedure for inspection of incoming materials. Procedures must guarantee the suitability of the information contained in the material supporting documents and those listed on the material packaging label. The company must have a written production procedure. Procedures must guarantee that all materials used for certified products are approved by LPPOM MUI.

The company must have a washing procedure. Procedures must ensure that the washing process removes various unclean or unclean materials. Companies must have procedures for storing and handling materials or products. Procedures must guarantee the absence of contamination of materials or products with unclean or unclean products including those from personnel. Proof of storage must be created and maintained. Transportation procedures are available. Procedures must guarantee that no contamination of materials or products is made by unclean or unclean materials. The intended scope of transportation includes transportation of materials from suppliers to the company's warehouse and between production facilities within the company.

h) Has a traceability system.

That is, the basic ingredients of the products produced can be traced halal. The company has procedures to guarantee the traceability of certified products. The purpose of traceability is that it can always be proven that the certified product comes from approved materials (including if there is an encoding of the material or product) and is produced in facilities that meet the criteria. Proof of product traceability must be made and maintained.

i) Procedure for handling non-halal products.

The company has procedures for handling products that do not meet the criteria. The procedure contains an exact definition of this product and how to handle it. Certified products that are already produced from materials that are not approved and or from facilities that do not meet the criteria are not sold to buyers who require halal products. If already sold, the product must be withdrawn. This



product may not be reworked, downgraded, reformulated. This procedure is anticipatory, because the possibility of errors is always there.

j) Have an internal audit team to conduct evaluations at least once every six months.

The company has written procedures for conducting internal audits. Internal audits are carried out by competent and independent parties in the area being audited. Independent parties include those from other departments (cross-auditing) or from parties appointed by management for this task, internal audits are conducted twice in depth a year. The implementation of internal audit can be integrated with other system audits (schedule, personnel, check list). The results of the internal audit are conveyed to those responsible for the activity being audited. The necessary corrective action must be determined and be able to resolve the weaknesses found and prevent future weaknesses from recurring.

k) Management review.

Is an assessment conducted by management or management representative related to the effectiveness of the implementation of HAS. The company must have written procedures for conducting a management review. Material Review include: Results of internal and external audits, Improvements from previous reviews, Changes in conditions in the company. The implementation of the review can be integrated with the review of other systems. The results of the review are submitted to those responsible for the implementation of HAS.

3.3 Integration of the eight aspects of ergonomics in the application of Halal Assurance System (HAS)

a) Energy / nutrition aspects

Physical work in the moderate to heavy category plus a workplace with a hot environment, carbohydrate and mineral needs are more dominant (Grandjean, 1993; 2000). Providing additional nutrition at rest is recommended to restore calories and restore energy. Work in the moderate to heavy category needs to be provided with appropriate drinks to be able to restore stamina (Atmaja, 2009; Arsa, 2011). The HAS system is implemented by workers in the industry, the process of providing drinks does not have to be outside the production area so as not to contaminate the products produced. The drinks that are given must not contain alcohol, or other substances which are prohibited so that the effects of deterioration of workers' health.

Nutrition calculation is also influenced by the results of the calculation of the value of the Body Mass Index (BMI) needed to determine the balance of a person's nutritional intake (Adiatmika, 2007). Overweight or underweight affects work health conditions, as reported by Ogden, et al. (2012) stated that obesity is a problem due to risk factors for the emergence of several diseases, whereas in



the opinion of May, et al. (2002) stated that BMI is an indicator of body fat, if BMI below 18.5 kg / m² is said to be very thin (underweight) while above 25.0 kg / m² is said to be obese (overweight) due to excessive fat accumulation. Sweat produced by workers must not enter and contaminate halal certified products, there should not be the slightest drop of sweat, including at the production facility. If the energy aspect is fulfilled, it can potentially accelerate performance on the criteria of the halal management team, training, halal policy. Because in this aspect more focused on meeting the nutritional needs of workers.

b) Musculoskeletal aspects

This analysis of musculoskeletal complaints is used to assess the level of worker productivity in terms of the physiological conditions of the worker's body. If workers do not use movements that are not in accordance with the anatomy of the body, then the worker is said to be healthy and productive, musculoskeletal complaints are expected to always decrease. This complaint has an impact on the handling of criteria for optimizing the halal management team, the lower the musculoskeletal complaints experienced by the workforce, then it is possible for productive opportunities to implement a halal guarantee system in the industry will continue to be maintained. The absence of complaints from workers, impact on the lack of drugs or health supplements needed by workers, so that the production area is sterile from external contaminants.

Physiologically, optimum muscle strength to work between 20 to 30 years (Reenen, et al., 2009), while according to Pheasant (1991) states that physical strength decreases at the age of 39 years. This opinion is in line with the statement of Manuaba (1998a, b: 2000; 2003) states that physical capacity is directly proportional to a person's age until the peak age of 25 years, whereas according to Grandjean (1993; 2000) and Pulat (1992) states that the peak of muscle strength is at the age range of 25 to 35 years. To optimize the application of HAS in the company, it is better to consider the productive age of workers who enter the halal management team.

c) Aspects of body posture

Body posture is related to muscle use. Excessive muscle use causes pain in certain bodies (Kee and Karwowski, 2007; Inzumi, 2008). A more ergonomic work attitude needs to be done, adjustments to standard operating procedures (SOP) oriented to natural work attitudes need to be done. Work attitude bent too extreme needs to be avoided because it is very dangerous. Side effects do not pay attention to the condition of the body's posture causes similar things including musculoskeletal complaints. This treatment allows contaminants outside the production process. Industrial activities on the production floor are not allowed to have contaminants from outside materials, workers need to be given training and understanding of handling processes in accordance with procedures. If this has been well considered, it could potentially accelerate performance on the



criteria of the halal management team, training, halal policy, outlined in the eleven HAS criteria.

d) Environmental aspects

Environmental aspects are important in handling halal guarantee products in the industry. The intended environmental conditions are the situation on the production floor, starting from received raw materials, processed raw materials, stored raw materials and finished products, to transportation of finished products to consumers.

Based on the results of measurements of temperature data in the industry obtained a mean value of 30.4 ° C, while the intensity of noise obtained an average of 68.78dB. When compared with the results of the Threshold Value according to the Decree of the Minister of Health No. 216 of 1998 Health Requirements for the Work Environment, threshold values for temperatures of 21-30 ° C and noise of 85dB to be able to work for 8 hours, so it can be said that temperature and noise can be recommended for work. Ambient temperature that does not exceed the value of NAB for work can provide comfort and safety. Handling of materials and products can be guaranteed safe conditions, even though certain materials and products require special handling.

e) Time condition aspects

Time conditions can also be used to schedule halal training and education time for all employees. The time conditions are used for reviewing the company's internal management and audit processes. Time conditions have a very broad effect on the productivity of human and corporate work. Human productivity is measured by the quality of life when working, while the condition of company productivity is measured from the level of fulfillment of financial targets that have been set in each periodic. Humans cannot work full time. Maximum Working Time is a person can work well with normal work environment conditions, generally counted 8 hours / day including rest hours (Suma'mur, 1982; Grandjean, 1993). Active breaks are needed to relieve fatigue for a moment and reduce workload (Susihono, 2014). The time condition is used to fulfill the HAS status target that has been obtained, or is used for business development while still considering the halal of the product produced. Good time conditions have the potential to accelerate the performance of written procedure criteria for critical activities, search capabilities, handling products that do not meet the criteria, internal audits, management reviews. Good time management will facilitate the ability to trace the raw materials used, so that halal guarantees can be carried out properly.



f) Socio-cultural aspects

The social aspect is one of the triggers for the acceleration of the implementation of the halal guarantee system in companies. Companies that have a commitment to keep their products in accordance with the matrix of raw materials and product matrices that have been reported to LPPOM MUI will be faster in integrating the implementation of the halal guarantee system. The speed of change in implementing the halal system is influenced by the worker's culture including understanding of halal. The application of the halal guarantee system through an ergonomic approach needs to consider culture. Ergonomics is applied by considering culture (Chapanis, 1974). value is heritage, the value that develops in the group and will continue to develop (Kaplan, 2004; Widyanti, 2011). culture becomes a reference in improving work (Manuaba, 1998). Socio-cultural aspects have the potential to accelerate the performance of written procedure criteria for critical activities, search capabilities, handling products that do not meet the criteria, internal audits, management reviews as set out in the HAS-23000 criteria.

g) Information aspects

Information is a means of communication from all sections in all departments in the company. Information that the company has committed to run a halal policy needs to be done, so that employees can know and understand. To facilitate the delivery of halal policy information. Halal policy must be written as an effort to show commitment to produce halal products consistently, and be socialized to all stakeholders of the company, including related material suppliers. Effective information will help the halal management team in the process of fulfilling the criteria of written procedures for critical activities, traceability, handling products that do not meet the criteria, internal audits, management reviews.

h) Aspects of Human-Machine Interface

Human and machine interaction is generally carried out on the production floor, and other places that are believed to use tools when working. Machines or tools used may not share facilities with products that have not been halal certified. This process aims to ensure that production activities are not contaminated with unclean or unclean materials or materials that have not been halal certified. The use of special facilities ensures that facility guarantees are not contaminated with other materials. The facility is also only washed using halal certified material. Handling the aspects of the Human-Machine Interface properly, will potentially accelerate the criteria for production facilities.



Table 1. Integration of 8 ergonomic aspects with HAS

HAS Criteria	K1	K2	K3	K4	K5	K6	K7	K8	K9	K10	K11
Energy/nutrition	√	√	√							√	√
Musculockeletal	√			√	√						√
Body posture	√			√							√
Environmental	√			√	√					√	√
Time condition	√	√	√				√	√	√	√	√
Socio-cultural	√	√	√				√	√	√	√	√
Information	√	√		√	√		√	√	√	√	√
Human-machine interface	√	√		√		√			√		√

Description : K1: Halal policy, K2: Halal management team, K3: Training and education, K4: Material, K5: Products, K6: Production facilities, K7: Written procedures for critical activities, K8: Traceability, K9: Handling products that are does not meet the criteria, K10: Internal audit, K11: Management review.

4. Conclusion

The results showed that from the identification of eight ergonomic aspects could improve the performance of industry, those are: aspects of energy/nutrition, musculoskeletal, Body Posture potentially accelerate the implementation of the criteria of the halal management team, training, halal policy, environmental aspects potentially accelerate the implementation of the criteria of materials handling, products, c) aspects of time condition, socio-cultural, information potentially accelerate the implementation of the criteria of critical activities, traceability, products handling that do not meet the criteria, internal audit, and management review, d) Human-Machine Interface aspects potentially accelerate the implementation of the criteria of production facilities. The acceleration of the application of HAS can be done by company management by paying attention to the identification of 8 ergonomic aspects.

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