

Description of Work Instructions as part of the Mechanical Hazard Risk Control in a Construction Company

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ABSTRACT

Introduction: The construction sector contributes the largest number of accident cases in Indonesia with an average incidence percentage of 32% each year. PT. WIKA Beton PPB Pasuruan uses sophisticated equipment to produce its products. To control the risk of mechanical hazards, the company has work instructions for each stage of the production process. This research aimed to provide an overview of how the work instructions are an effort to control the risk of mechanical hazards in the box pile production process at PT. WIKA Beton PPB Pasuruan. **Method:** This research was a descriptive study with a qualitative approach. The data collection technique used secondary data. The data used came from the company documents that included the IBPR-P document, Procedure document, and Work Instructions. **Result:** The mechanical hazards found in the production process of the box piles included being hit by a mold/product due to a broken sling, a PC Strand breaking during stressing, PC Strand punctured limbs, and the pile of products collapsing. The control of these four mechanical hazards was found in the Long Line Non-Turning Production Reinforcement Assembly Work Instructions, the Long Line Non-Turning Production Prestress Iron Drawing Work Instructions, and the Long Line Non-Rotating Production Product Stacking Work Instructions. **Conclusion:** In the work instruction documents, there were specific explanations of the work stages that relate the risk of mechanical hazards in the box pile production process. Implementing Work Instructions as a form of mechanical hazard control can reduce the level of potential hazard to a low risk level.

Keywords: mechanical hazards, risk control, secure work, work instructionst

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INTRODUCTION

Everyone needs protection when it comes to their safety and physical health. By obtaining the right to protect their safety and physical health, humans can live their lives optimally. The protection of workers' rights is carried out by implementing occupational safety and health efforts to realize optimal work productivity. This is in line with the research by Nur and Oktafia (2017) and Samahati (2020) which states that occupational safety and health positively influences worker productivity. The research by Wahyuni, Suyadi and Hartanto (2018) states that the percentage of influence of occupational safety and health on worker productivity is 67.9%.

Occupational safety and health in the workplace is important as every workplace has potential hazards. Sources of danger in the workplace can cause occupational accidents and occupational disease. For example, the use of sophisticated work equipment influences the possibility of work accidents and work-related illness (Agustina and Mulyono, 2018).

Based on data from the Institution of Social Security Employment, Indonesia's rate of work accidents is still high. It was recorded that 123,040 work accidents occurred in 2017 (Institution of Social Security Employment, 2017). Furthermore, according to the data from the Ministry of Public Works and Public Housing in 2017, the construction sector contributed to the largest number of accident cases in Indonesia with an average of around 32% out of the total each year (Ministry of Public Works and Public Housing, 2018). Looking at the average of accident cases, it can be considered that the construction sector is an occupation with a high rate of potential hazards.

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The danger posed can cause injury to humans or damage to the equipment and the environment (Sumarna, Sumarni and Rosidin, 2018). Based on the work of Ponda and Fatma (2019), every work process must contain a hazard factor, such as excessive pressure or too high a temperature causing an explosion or fire hazard. Each potential hazard that exists must be identified and then assessed as to the extent to which it affects the safety and health of workers and the entire work process (Sumarna, Sumarni and Rosidin, 2018). The assessment results can then be used as an input when preparing a plan to prevent and control unwanted events due to a hazard.

The research by Werdaya (2019) found that there are 77 potential hazards in a construction project on average, and that 60 of them are mechanical hazards. According to Wijarnako (2017), mechanical hazards are the hazards caused by machines or work tools and their movement. The movement of machines can cause workers to be injured, such as cuts, falls, crushing, and so on.

PT. Wijaya Karya (Persero/company) Tbk. is a leading state company in Indonesia engaged in the construction sector. It plays a major role in infrastructure development. To date, PT. WIKA has seven subsidiaries, one of which is PT. WIKA Beton Tbk. PT. WIKA Beton is a company that operates a concrete production process and provides construction services. Thus, PT. WIKA Beton Pasuruan Concrete Product Factory (PPB) comes with a high rate of potential hazards in its activities. Therefore, occupational safety and health is an important thing to strive for. One of the occupational safety and health efforts that can be made to protect the workers and prevent occupational accidents and occupational diseases is to conduct a risk assessment of the different stages of work activity at PT. WIKA Beton PPB Pasuruan.

The production process is the main activity at PT. WIKA Beton PPB Pasuruan with the majority of the workers working in the production department. In the production process, PT. WIKA Beton PPB Pasuruan uses sophisticated equipment to produce its products. One of the products produced is box piles. Through the use of sophisticated machines and equipment, this production process cannot be separated from the risk of work accidents which are most likely caused by mechanical hazards.

To avoid and prevent occupational accidents and diseases in the box pile production process, PT. WIKA Beton PBB Pasuruan has produced

work instructions for each stage of the box pile production process. A work instruction is a form of administrative control against hazards in the workplace. Work instructions contain the work directions while also considering hazard identification, risk assessment, and technical calculations. Based on the research conducted by Firmandhani (2016), a mechanical hazard control that can be conducted is to work according to the instructions. By working under the existing work instructions, it is expected that all work activities will run according to the plan and work order. Thus, the workers can avoid the existing hazards.

Based on the description above, this research aimed to provide an overview of how work instructions are part of an effort to control the risk of mechanical hazards in the box pile production process at PT. WIKA Beton PPB Pasuruan.

METHODS

This research was conducted to examine the production process of box piles at PT. WIKA Beton PPB Pasuruan in February 2021. It was a descriptive study with a qualitative approach. The data collection technique used in this research involved secondary data. The data was obtained from literature studies related to risk assessments and company documents, including the IBPR-P document (Hazard Identification, Risk Assessment - Control) production process, Production Process Activity Procedure documents, and Production Process Work Instructions.

In this research, the first activity was to sort out the hazard identification data from the company's IBPR-P documents that referred to mechanical hazards. Furthermore, the hazards that were based on an unacceptable risk assessment and thus required control were determined. At PT. WIKA Beton, the acceptable level of risk was low level (L). If the

Table 1. Likelihood Scale

Level	Description
A	Is expected to occur in most circumstances / almost certain
B	It will probably occur in most circumstances / likely
C	Might sometimes occur / moderate
D	Could occur sometime / unlikely
E	May occur only in exceptional circumstances / rare

risk level was above the low level, controls had to be presented for the hazard. After that, this research observed what kind of hazard control was present in the company's Work Instruction document.

The risk assessment was presented by referring to the AS/NZS 4360: 2004 standard consisting of assessing opportunities and consequences. The probability and effect rating scale based on the AS / NZS 4360: 2004 standard is as follows.

After getting the opportunity and consequence value, the next step was to determine the level of risk by entering the opportunity and affected values into the risk matrix. Based on the AS/NZS 4360: 2004 standard, there were four levels of risk: Extreme Risk (E) that requires immediate action,

High Risk (H) that needs senior management attention, Moderate Risk (M) that needs management responsibility specifications, and Low Risk (L) that can be managed through routine procedures.

RESULT

The Identification and Assessment of Mechanical Hazard Risks in the Production Process of Box Piles at PT. WIKA Beton PPB Pasuruan

Based on the results of the interviews conducted with the HSE Staff of PT. WIKA Beton PPB Pasuruan and from the results of the field observations, there were found to be several mechanical hazards in the different stages of the box pile production process at PT. WIKA Beton PPB Pasuruan using tools/machines in its main activities. The mechanical hazards and risk assessment based on the company's IBPR documents can be seen in Table 4.

Being hit by a mold/product can result in serious injury, disability, a loss of bodily functions, and death. In addition, this potential hazard can also cause large to very large material losses due to damaged molds/falling products and hampered work activities, meaning that production decreases. Following the description, the impact of being hit by a mold due to a broken sling is considered to be in category 4. Meanwhile, the chance of the danger of being hit by a mold due to a broken sling is considered to be in category E (rare, happens after many years). By assessing the consequences and opportunities, a mold hit due to a broken sling in the bridge crane operation process to lift the box pile mold is included in the high-risk category in the risk assessment matrix.

Table 2. Consequence Scale

Level	Description
1	No injuries, low financial loss
2	First aid treatment, medium financial loss
3	Medical treatment required, high financial loss
4	Extensive injury, loss of production capability, major financial loss
5	Death, huge financial loss

Table 3. Matrix for Determining the Level of Risk

Likelihood	Consequence				
	1	2	3	4	5
A	H	H	E	E	E
B	M	H	H	E	E
C	L	M	H	E	E
D	L	L	M	H	E
E	L	L	M	H	H

Table 4. Assessment of the Mechanical Hazard Risks in the Production Process of Box Piles at PT. WIKA Beton PPB Pasuruan 2021

Activity	Potential Hazard	Risk Assessment		
		Consequences	Likelihood	Risk Level
Operation of the bridge crane to lift the mold	Struck down by the product/mold because the sling is broken	4	E	H
The process of drawing reinforcements using a stressing machine	PC Strand is broken off during stressing	4	E	H
	The body is impaled by the PC Strand	4	E	H
Operation of a portal crane for product stacking	Dropped by the product because the sling is broken	5	E	H
	The pile of products collapses	5	E	H

Meanwhile, the impact of being hit by a product due to a broken sling is considered to be in category 5. This happens because the finished box pile product has a heavier weight than the mold, so the consequences will be worse. Meanwhile, the probability of its occurrence is considered to be included in category E (rare, happens after years). By assessing the consequences and opportunities, the product was hit by a broken sling in the process of operating the portal crane for stacking the box pile product which is included in the high-risk category in the risk assessment matrix.

The disconnection of the PC Strand during stressing can cause delays in the production process and decrease the production rate. Following the description, the result of the PC Strand breaking was considered to be in category 4. Meanwhile, the chance of the PC Strand breaking up during stressing was considered to be rare and only occurred after years, therefore it was included in opportunity category E. By assessing the consequences and opportunities, the PC Strand breaking up when stressing the box pile production process was included in the high-risk category in the risk assessment matrix.

The potential danger of limb impingement by the PC Strand was considered rare. As a result of piercing the limbs with the PC Strand, serious injury, disability, and a loss of bodily functions can result. Based on the description, the result of being pierced in the limb by the PC Strand falls into category 4. In comparison, the chance of the occurrence of the limb being pierced by the PC Strand are included in the category E (rare, happens after many years). By assessing these consequences and opportunities, the PC Strand impaling the limbs in the reinforcement process using stressing machines as part of the box pile production process was included in the high-risk category.

The collapse of a pile of box pile products in the stockyard can result in significant death and material loss, although this potential hazard is rare. For example, the death of a worker is the worst result of a collapsing pile of products. If the pile collapses, there are often workers around which means that the box pile can crush the workers. Meanwhile, a very large loss can be experienced by the company due to the collapse of the pile of products due to the possibility of damage to the products when it falls from the pile. This requires repair or reproduction, both of which cost more. Therefore, the collapse of the pile of products is considered to be

in category 5 (death, very large material loss). At the same time, the probability of its occurrence is included in category E (rare, happens after many years). According to the impact and opportunity assessment, a collapsed product pile in the stacking process is included in the high-risk category in the risk assessment matrix.

Work Instructions as an Effort to Control the Risk of Mechanical Hazards

Based on the risk assessment results and the potential for mechanical hazards in the production process of the box piles of PT. WIKA Beton PPB Pasuruan, five of them were included in the high-risk category. This means that the five potential hazards could not be accepted as is and must be controlled. In the Production Process Activity Procedure document, the control of the four mechanical hazards can be found in the three Work Instructions.

Work Instructions for the Long Line Non-Rotating Production Line Reinforcement Assembly

A mechanical hazard control point can be found in the Work Instructions of the Long Line Non-Rotating Production Line Reinforcement Assembly. An order is listed to roll out the rope/spiral based on the distance spec before it is tied off and added to the lifting point.

Table 5. Prestressed Iron Initial Withdrawal Amount at PT. WIKA Beton PPB Pasuruan 2021

	Diameter (mm)	Early Withdrawal (Kg)
		20%
PC Strand	9.5	2080
	11	2820
	13	3740
	15	5320

Table 6. The amount of prestressed iron final withdrawal at PT. WIKA Beton PPB Pasuruan 2021

	Diameter (mm)	Final withdrawal		
		70%	75%	78%
PC Strand	9.5	7280	7800	8112
	11	9870	#####	#####
	13	#####	#####	#####
	15	#####	#####	#####

Work Instructions for the Withdrawal of the Long Prestress Iron Production Line

In the Work Instructions for the Withdrawing of the Prestress Iron for the Long Line Production of Non-Rotating, PT. WIKA Beton listed the initial and final withdrawal amounts when using a single stressing machine. Tables 5 and 6 show the number of pulling strengths that have been converted into units on the manometer based on the appropriate engineering calculations. Based on Table 5, the initial withdrawal was made at 20% of the weight of the PC Strand. Meanwhile, based on Table 6, a PC Strand with a diameter of 9.5 mm carried out the final draws three times in stages. The 11 mm diameter PC strands were subjected to a final withdrawal of 70% by weight, and for the PC strands of 13 and 15 mm diameters, only one initial draw was made.

Work Instructions for the Stacking Long Line Non-Rotating Production Products

In the Work Instructions for the Stacking of Long Line Non-Rotating Production Products,

Table 7. Stacking Box Piles at PT. WIKA Beton

No	Dimension of the product (mm)	Product Length (m)	Maximum Stack Distance	Number of Stacks
1	200	6 – 9	4	10
2	250	6 – 11	4	9
3	300	6 – 12	4	9
4	350	6 – 13	4	8
5	400	6 – 14	4	7
6	450	6 – 14	4	6
7	500	6 – 14	4	4

PT. WIKA Beton listed several mechanical hazard control points, including installing the anvil wood to the bottom pile as a base, installing the foundation wood to the next pile so the wood must be in line with the position of the wood under it, and installing a wooden wedge on each pile of the outer product. For box piles, the standard wedge wood size is 6x12 cm. The number of piles must also follow the stacking table with the number of piles of product in the transverse direction of the stockyard of at least 50 cm and a maximum length of the cantilever of 1.5 m.

Table 7 shows the maximum distance and number of piles of box piles adjusted based on the dimensions and length of the product. This is done as a form of control to lessen the danger of collapsing piles of products when they are stacked up in the stockyard.

Assessment of the Mechanical Hazard Risk in the Production Process of Box Pile PT. WIKA Beton PPB Pasuruan After Control

After controlling for mechanical hazards, one of which is the application of work instructions, the risk assessment was carried out again in the pile production process to determine the remaining risks. The remaining risk must be at a low level to be accepted.

Based on Table 8, the risk assessment scores of all potential mechanical hazards, which included being hit by a product/mold due to a broken sling, a broken PC Strand during stressing, a limb punctured by a PC Strand, and a pile of collapsed products, that were previously in the high-risk level were successfully reduced to low risk.

Table 8. Assessment of the Mechanical Hazard Risks after Control in the Production Process of Box Pile PT. WIKA Beton PPB Pasuruan 2021

Activity	Potential Hazard	Risk Assessment		
		Consequences	Likelihood	Risk Level
Operation of the bridge crane to lift the mold	Struck down by the product/mold because the sling is broken	2	D	L
The process of drawing reinforcement using a stressing machine	PC Strand is broken off during stressing	2	D	L
	The body is impaled by the PC Strand	2	D	L
Operation of a portal crane for product stacking	Dropped by the product because the sling is broken	2	D	L
	The pile of product collapses	2	D	L

DISCUSSION

The Identification and Assessment of Mechanical Hazard Risks in the Production Process of Box Piles at PT. WIKA Beton PPB Pasuruan

To control a hazard, first it is necessary to carry out hazard identification and risk assessment. Based on Government Regulation No. 50 of 2012 concerning the Implementation of Occupational Health and Safety Management Systems, companies employing more than 100 people must implement an occupational health and safety (OHS) management system (Indonesian Government, 2012). The OHS management system itself comes with various kinds of benefits for both workers and companies. Based on Lussa's (2021) research, the implementation of the OHS management system has a positive and significant effect on performance effectiveness. In addition, the implementation of the OH&S management system gives employees a sense of security when carrying out their duties and jobs.

According to Government Regulation No.50 in the Year 2012, one of the stages in the OHS management system is OHS planning. This is conducted by considering hazard identification and risk assessment. In this case, PT. WIKA Beton PPB Pasuruan has created Hazard Identification and Risk Assessment documents for every activity in the company. Furthermore, it is used as the basis for every OHS activity in the company, such as control efforts.

Struck by Mold/Product because the Sling is Broken

In the preparatory stage of molding the box piles, the molds are lifted and joined together with the help of a bridge crane. Likewise, stacking the finished box piles in the stockyard is assisted by a portal crane. The possible mechanical hazard is being crushed by the product (molds and box piles) in both of these stages due to a broken sling. Broken slings can occur when the product is not lifted at a point where the lift is balanced according to the weight of the product being lifted.

The risk assessment for the potential danger of being hit by a mold/product due to a broken sling is a high-risk level, following the previous research conducted by Ulkhaq and Putri (2018) who assessed that the work step of being crushed by reinforcement

assemblies and crushed by molds has a high-risk status.

PC Strand is Broken during Stressing

In the stressing stage, for the production of box piles, PT. WIKA Beton uses two machines, a Single Stressing Machine and a Simultaneous Stressing Machine. While making a withdrawal using a Single Stressing Machine, there are possible mechanical hazards that can occur. For example, if the prestressed iron withdrawal is not carried out by the existing engineering calculations, the PC Strand will break and cause delays in the production process due to work accidents. To avoid this, it is necessary to have a clear mechanism for regulating activities so then the work runs smoothly and safely (Ekasari, 2017).

The Body is Impaled by the PC Strand

When the stressing process does not follow the existing technical calculation standards, a mechanical hazard arises, such as the breaking of the PC Strand. From the breakdown of the PC Strand, a further danger can occur, which is a limb being punctured by the PC Strand. This can occur if, in the middle of the stressing process, the PC Strand suddenly breaks. The PC strand will move in an erratic direction, causing the worker in charge to be punctured by the PC Strand.

The risk assessment for the potential hazard of the PC Strand piercing limbs is included in the high-risk level. This follows the example of the study conducted by Ulkhaq and Putri (2018) who assessed that the PC Strand work step had a high-risk status.

The Pile of Product Collapses

After the box piles are finished, the product will be lifted and stacked in the stockyard before being distributed. During the stacking of these products, there is a potential hazard of the product stack collapsing. This can occur if the ground is unstable, if the number of piles of product exceeds the calculation capacity, or if the wooden base is not arranged parallel so then the pile of products is not stable.

The risk assessment for the potential danger of product stacks collapsing in this study is included in the high-risk level category. This is following the research conducted by Ulkhaq and Putri (2018) who

assessed that the potential danger of falling products has a high-risk status.

Work Instructions as an Efforts to Control the Risk of Mechanical Hazards

Work instructions are guidelines containing the procedure and sequence of work that the workers must control and undertake to operate the equipment (Saifulloh, Kurniawan and Wahyuni, 2019). According to Saifulloh, Kurniawan and Wahyuni (2019), work instructions benefit the workers in terms of them knowing the parameter limits, maintaining the machine life, as a reminder of how to operate the equipment, and maintaining the safety of the operators themselves while working.

According to Dharma, Putera and Parami (2017), in their research, when minimizing the impact of OHS risks, it is necessary to carry out risk control, periodic evaluations, to determine emergency scenario procedures, and to follow the work instructions. Furthermore, working according to complete and clear work instructions will make it easier for the workers to operate and obey them when carrying out their work because they have clear references (Saifulloh, Kurniawan and Wahyuni, 2019).

At PT. WIKA Beton PPB Pasuruan, the work instructions were explained in the procedure document. After briefly explaining the flow of the stages of their work activities, they explained the work steps of each stage on the work instruction sheet in more detail.

Based on the research by Hasrinal, Diflaizar and Sary (2019), there is a relationship between the application of SOPs and the incidence of work accidents among production workers. Likewise, Putri, Suroto and Wahyuni's (2017) research showed that there is a relationship between the implementation of SOPs and the risk of work accidents. The more disobedient the workers are in relation to the existing SOPs, the higher the risk of work accidents. The practice of implementing SOP itself can be supported by installing SOPs in every part of the work process. The research by Alfidyani, Lestantyo and Wahyuni (2020) shows that there is a relationship between the practice of implementing SOPs and the risk of work accidents.

Work Instructions for the Long Line Non-Rotating Production Line Reinforcement Assembly

In this work instruction, there is an order to roll out the rope/spiral according to the distance spec. It is tied and added to the lift point as a form of control to combat the mechanical hazard of being hit by the mold due to a broken sling. Broken slings can occur if the lifting of the product is not carried out at a point where the lifting is balanced according to the weight of the product being lifted. This causes the lifting load to be heavier, exceeding the sling lifting weight capacity used. By implementing work instructions properly in the field, the work order is also safe, and workers are guaranteed safety and security (Ekasari, 2017).

Work Instructions for the Withdrawal of Long Prestress Iron Production Line

Work instructions are made to ensure the health and safety of workers (Ekasari, 2017). In the Work Instructions for Withdrawing the Prestress Iron for the Long Line Production, PT. WIKA Beton lists the initial and final withdrawal figures using a single stressing machine as shown in Tables 5 and 6. Tables 5 and 6 have been made based on the technical calculations. With this table, the PC Strand stressing strength is shown to meet the required standards and is still within its flexibility limits. Thus, the mechanical hazard of the breaking of the PC Strand during stressing can be controlled. In addition to the danger of breaking the PC Strand during stressing, this work instruction can also control the danger of being punctured by the PC Strand in the limbs due to the sudden movements in all directions of the PC Strand during stressing.

Work Instructions for Stacking Long Line Non-Rotating Production Products

The points mentioned, along with the stacking table in the work instructions listed in Table 7, are a form of control to lessen the danger of product stacks collapsing when stacked in the stockyard. With a stable foundation soil, the number of product piles according to the capacity calculation, and the stability of the box piles, it is expected to minimize the danger of collapsing product piles. According to Ulkhaq and Putri (2018), to reduce this potential

hazard, workers should ensure that the supports used follow the specifications so then they can withstand the load of the concrete pile.

Assessment of the Mechanical Hazard Risks in the Production Process of Box Pile PT. WIKA Beton PPB Pasuruan After Control

After controlling, one of which is the application of work instructions, all mechanical hazard risk assessment scores have been successfully lowered to be accepted. However, even though the danger has been categorized as tolerable, it is better if the workers are still required to wear PPE to avoid unwanted events due to these hazards (Urrohmah and Riandadari, 2019). Although PPE does not eliminate the dangers that exist, wearing PPE can prevent the workers from getting severely injured (Cahyaningrum, Sari and Iswandari, 2019).

The risk assessment score for all potential mechanical hazards, namely falling products/molds due to broken slings, PC strands breaking when stressed, limbs impaled by PC strands, and piles of collapsing products that were previously included in the high-risk level were successfully reduced to being low risk.

The research by Aisyah (2016) states that there is a moderate correlation between compliance with work instructions and safe behavior among the workers. The more obedient the worker, the safer his behavior will be, and the more he will avoid accidents due to the risk of hazards in the workplace. Therefore, when implementing SOPs or work instructions, it is necessary to effectively involve the workers in the functioning of the SOPs and work instructions. This involvement is in the form of discipline and the compliance of the workers with the existing standards and regulations (Cahyaningrum, Sari and Iswandari, 2019). According to Latif, Priyatna and Pertiwi (2017), it is necessary to give strict sanctions to workers who do not comply with the SOPs and work instructions because the workers' practice of the SOPs is related to work accidents.

According to the research by Cahyaningrum, Sari and Iswandari (2019), there is a relationship between work accidents and the use of personal protective equipment. The research by Aswar, Asfian and Fachlevy (2016) also states that there is a relationship between the use of PPE and work accidents among workers. Mantiri, Malingkas and

Mandagi (2020), in their research, stated that the use of PPE is the best step to minimizing the impact of risks. Using PPE every time you do your job will be very effective at avoiding the risk of work accidents that threaten workers.

Since the preparatory stages have not been listed before the work instructions at PT. WIKA Beton PPB Pasuruan, so then the work instructions better function as a control against hazards, the company should add a preparation section before work and include controls using personal protective equipment in the work instruction document. This is intended to make the workers more disciplined and ease them into remembering to use PPE because the order to use PPE is stated in the work instruction document.

CONCLUSION

Mechanical hazards can be found in the production process of box piles at PT. WIKA Beton PPB Pasuruan. These include being crushed by a mold/product due to a broken sling, the PC Strand breaking during stressing, the PC Strand piercing limbs, and the pile of products collapsing. Each of these mechanical hazard controls can be found in the Long Line Non-Turning Production Reinforcement Work Instructions, the Long Line Non-Turning Production Prestress Iron Drawing Work Instructions, and the Long Line Non-Turning Production Product Stacking Work Instructions in the form of work orders and technical calculation tables. After controlling them by applying Work Instructions, the risk level of all mechanical hazards previously included in the high-risk level has been successfully reduced to low risk.

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