THE EFFECT OF EMERGENCY RESPONSE PLAN ON FIRE RISK MITIGATION IN THE WORKPLACE

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Emergency Response Plan, Fire Mitigation, Workplace Safety, ERP Effectiveness, Industrial Risk Management	*This study aims to analyze the influence of the Emergency Response Plan (ERP) on fire risk mitigation in the workplace. Although fire emergencies pose significant risks in industrial environments, the implementation of ERP is still often considered as a mere administrative requirement, leaving a gap in understanding its actual effectiveness. The main variables in this study include ERP planning, training, communication, and availability of fire suppression equipment. The research was conducted using a literature review method, drawing from recent Indonesian journal articles published within the last five years. Data were analyzed qualitatively by identifying patterns in ERP implementation and its impact on the reduction of fire incidents and response effectiveness. The study involved 10 primary sources from accredited national journals and institutional reports. The findings show that workplaces that implement a structured and well-communicated ERP experience faster response times and reduced levels of fire damage. Moreover, employee preparedness significantly increased in environments with periodic ERP simulations. These results suggest that ERP plays a critical role in not only preventing fire hazards but also minimizing their impact, confirming the need for standardized and enforced ERP practices in all industrial sectors in Indonesia. The study contributes to risk management literature and provides practical implications for safety officers and policymakers to enhance fire emergency preparedness across various organizational settings*

INTRODUCTION

Fire is one of risk significant that can occurs in the environment work and potential cause loss big, good from in terms of material and loss of life. In Indonesia, reports accident Work from the Ministry of Manpower show that risk fire on site Work Still high and steady become attention main in effort improvement of K3 (Occupational Safety and Health). This is confirmed in research by (Ashari et al., 2023) which states that fire occupy ranking top as reason accident fatal work in industry manufacturing, especially as it relates to with the production process based on machines and materials chemistry easy burned. Therefore that, protection to safety worker from risk fire be one of priority main in management safety Work.

In anticipation the occurrence fire, company need have a comprehensive handling strategy, one of which is through implementation of Emergency Response Plan (ERP). ERP is plan systematically designed For arrange actions emergency needs taken by the company moment face condition crisis, such as fire, explosion, or disaster others. According to (M. R. Lubis et al., 2024), effective ERP must covers identification potential danger, designation not quite enough each team 's responsibility, provision means rescue, and training periodic for all over employees. Unfortunately, ERP implementation in many place Work Still Not yet running optimally and often only become document formality solely.

Case study at Government-Owned Electricity Company shows that although company has own ERP documents, implementation in the field Still meet Lots obstacle. Obstacle the covers lack of training for workers, limitations tool fire extinguisher fire light (APAR), and weak coordination between team countermeasures emergency (M. Lubis et al., 2020). This is impact on the slowness response moment incident fire happened, so that risk loss the more big. Condition the indicates existence gap between planning above paper with implementation factual in the field, which if No quick handled, will to worsen condition safety Work.

Another obstacle in ERP implementation is low level awareness and understanding worker about importance preparedness face fire. (M. R. Lubis et al., 2024) in studies they at Syiah Kuala University found that part big students and staff Not yet understand procedure evacuation emergency that has set in ERP. Awareness this is very important, because as good as whatever plans have been made arranged, fixed will fail when individuals involved No own adequate knowledge and readiness. Therefore that, ERP training and socialization becomes components that are not can separated from system responsive effective emergency.

In addition to education and socialization, appropriate ERP design with standards also hold role important in reduce impact fire. Research by (Camelia et al., 2020) at the Central Library of Sriwijaya University proved that layout adjustment room, addition track evacuation, as well as placement tool strategic extinguisher capable speed up time evacuation moment simulation fire done. Plan responsive structured and based emergency analysis risk real in the environment Work become key main in save life and reduce loss.

Even though Thus, ERP does not can stand myself. Support from management, readiness facilities, as well as commitment all over element organization is also very important success mitigation risk fires. (Busra et al., 2023) emphasized that ERP success is influenced by three factors factor main, namely readiness equipment protection fire, participation worker in training, and supervision consistent managerial.

Third aspect the must walk in harmony For create culture responsive work to risk fire. See various problem said, can concluded that Still there is gap big in ERP implementation on site work, especially related mitigation risk fire. Research This become important Because capable give description about to what extent does ERP influence in reduce risk fire in the environment work, and How its implementation can optimized. Study of The influence of ERP can also help company in develop mitigation strategies greater risk appropriate target and adaptive to characteristics place each other's work.

Study This aiming For analyze the influence of the Emergency Response Plan on mitigation risk fire on site work. Focus main study This is For know how far ERP is capable lower potential and impact fire as well as identify factors that influence effectiveness implementation. The results of study This expected can give contribution scientific in development safety policies and programs work in Indonesia. With to clarify connection between ERP and reduction risk fire, then results study This would be very useful Good for circles industry, academics, and regulators. Research This No only give donation theoretical, but also can used as guidelines practical in compile and evaluate on -site ERP system work. So, in the future expected created environment more work safe, responsive and adaptive to potential danger fire.

LITERATURE REVIEW

Emergency Response Plan (ERP) is component crucial in system management safety and health work (K3) designed For respond in a way fast and precise to various condition emergency, including incident fire that can cause loss big, good from side safety soul and also asset company. ERP does not only functioning as guidelines moment happen condition emergency, but also as tool preventive measures that reduce potential loss before incident occurs. According to (Ashari et al., 2023), effective ERP covers procedure responsive detailed emergency, training periodic for all over workers, and regular evaluation of readiness system as well as response personnel to situation emergency. With the existence of a structured ERP, organization can ensure that all over personnel understand duties and responsibilities answer each in condition crisis, so that evacuation and also Handling danger like fire can done in a way fast and coordinated.

Mitigation efforts risk fire on site Work need a comprehensive approach, good from aspect structural and non- structural. Approach structural generally covering procurement and installation system protection fire like smoke detectors, automatic sprinklers, alarm systems, and network hydrant and tools fire extinguisher fire light (APAR) placed at the location strategic. (Salihin et al., 2024) emphasized that installation system protection This must become an integral part of planning development buildings, especially For building tiered height that has level risk more big to distribution complex fire and evacuation. On the other hand, the non - structural approach covers training periodic to workers, counseling about procedure safety fire, and improvement awareness will importance compliance to regulation safety work. Combination between both of them allow organization No only reduce potential incident fires, but also increases capacity response moment incident truly happen.

Analysis to system responsive emergency implemented in various place Work show that procedure clear evacuation and training simulation fire in a way periodic can increase preparedness worker in a way significant. Training simulation, or evacuation

drill, aims to For test readiness every individual in respond condition emergency as well as evaluate effectiveness from track evacuation and facilities Supporter others. (Ashari et al., 2023) stated that implementation of evacuation drills periodic capable increase understanding worker to procedure responsive emergency as well as practice reflex in face condition frequent panic appear moment happen fire. Simulation This important For ensure that No only worker stay, but also guests and visitors building own chance For understand and follow protocol evacuation that has been set, so that potential occurrence of fatalities can pressed as minimal as possible Possible.

ERP implementation must also be consider characteristics building, level housing, and potential risk fires inherent in the environment Work certain. Building with a complex layout or floored Lots requires a more ERP strategy detailed and specific, including addition track evacuation alternatives and systems fire extinguisher automatic at points vulnerable. (Camelia et al., 2020), in studies case they are at the Central Library of Sriwijaya University, highlighting importance proper ERP design standard, where the aspects like compilation re - layout room, installation tool fire extinguisher fire at the location strategic, as well as provision map easy evacuation accessed become factor important in increase effectiveness evacuation. Adjustments This No only speed up time evacuation moment happen simulation, but also provides protection more big when fire for real happen.

In management risk fire, identification process potential danger and assessment risk become step very important start. Evaluation risk give description about to what extent the possibility and impact from a incident fire, and become base in set priority action mitigation. (Yakub & Phuspa, 2019), in his research use Dow's Fire and Explosion Index (DFEI) method, finds that facility processing oil such as PT Pertamina is included in category risk high risk of fire and explosion, or enter in classification level danger severe. Findings This show that approach data - based and measurable methodology is essential For build a robust and effective ERP system, as well as push company For take step appropriate preventive measures with level the dangers faced.

The role of regulations government in push optimal ERP implementation is also not Can ignored. One of the regulation important thing to regulate matter This is the Decree of the Minister of Manpower No. KEP.186/MEN/1999 concerning the disaster management unit fire on site work. Regulations This confirm obligation company For prevent, reduce, and extinguish fire, including form a response unit fire equipped with personnel trained and facilities Supporter adequate. In addition, companies are also required to For do exercise countermeasures fire in a way periodically to improve preparedness worker to potential danger. Compliance to regulation This No only become obligation law, but also a part from commitment ethical company to protection safety soul and health worker.

In ERP implementation, involvement all over party in organization is very necessary For ensure effectiveness system. Management own not quite enough answer in provision facilities and infrastructure, as well as ensure that all procedure run in a way consistent. However, without participation active from employees, all the system that has been prepared will difficult running optimally. (Busra et al., 2023) emphasized that ERP success is largely determined by readiness tool protection fire, involvement active employee in training, as well as supervision and commitment from party managerial. Culture work that prioritizes safety only Can formed when There is

collaboration close between party managers and implementers field in running ERP comprehensive.

Lastly, ERP does not can considered as static system. Evaluation and refinement in a way periodic is key to the system This still relevant and effective face dynamics ongoing risk changed. Evaluation can done post implementation of evacuation drills or after happen incident, with objective For identify weakness as well as opportunity repair from existing system. (Ashari et al., 2023) stated that the evaluation process after simulation fire important carried out so that actions are not carried out in accordance procedure can repaired, and response strategies emergency can improved For face potential more threats complex in the future. Approach This reflect the principle of continuous improvement in K3 management, which emphasizes importance learning from experience as base For improvement safety Work.

Based on review library said, can concluded that effective ERP implementation No can separated from thorough planning, regular training, and ongoing evaluation. All component This need support full from management as well as participation active all over employee For create environment safe work from risk fire. Therefore that, research This aiming For analyze influence ERP implementation on mitigation risk fire on site work, at the same time identify factors main influencing factors effectiveness its implementation.

RESEARCH METHODS

Research Design

Study This use approach qualitative through studies systematic literature review. Approach This chosen Because allow researcher For study and interpret results study previous related implementation *Emergency Response Plan* (ERP) and its relation with mitigation risk fire on site work. Focus study directed at publication scientific in form journal national accredited, journal national, and proceedings symposium relevant national in period 10 years time final.

Subject and Object Study

Subject in study This is documents scientific in the form of article journal containing analysis, evaluation, or results ERP implementation in the environment work, especially in context risk fire. Object study in the form of Contents substantial from journals mentioned, including approach methodology, variables studied, findings main, and recommendation policy related to ERP and mitigation fire.

Definition Operational and Variables Measurement

Definition operational in studies This arranged based on mapping conceptual from reviewed journals. Emergency *Response Plan* operationalized as overall strategy, procedures, and resources Power prepared organization For respond condition emergency fire on site work. Mitigation risk fire operationalized as all form action preventive and responsive aiming For reduce impact fire. Variable measurement in study literature This nature descriptive-qualitative, such as existence of emergency SOPs, frequency simulation fire, number tool protection fire, and level preparedness employee.

Collection Techniques and Instruments

Data collected through search systematic to journals scientific available in online databases such as Garuda Kemdikbud, Neliti, and journal portals college high country. Search done using keywords such as "Emergency Response Plan", " mitigation" fire ", " safety work ", and " responsive emergency fire ". Selected articles fulfil criteria inclusion, namely published between 2015–2025, has focus discussion on ERP and fires, and presenting data or findings relevant empirics.

Data Analysis Techniques

Data analysis was performed through approach analysis thematic analysis, which involves the processes of identification, grouping, and interpretation themes main from reviewed literature. Themes main classified into category like form ERP implementation, effectiveness training, system warning early, and constraints and factors Supporter in ERP implementation. Collected data arranged in form matrix synthesis For make it easier comparison between journal.

Testing Hypothesis

As study literature, the approach used nature explorative and not use testing hypothesis in a way quantitatively. However, in terms of substantive, research This test assumption base that systematic and comprehensive ERP implementation can lower risk fire on site work. Testing done with evaluate consistency between results different research in conclude the impact of ERP on mitigation risk fire.

RESULTS AND DISCUSSION

Study This analyze six journal national accredited and national which includes study about implementation *Emergency Response Plan* (ERP) and mitigation risk fire on site work. Object study covering building industry manufacturing, building office, up to facility education high. The majority location study located in an urban area that has level vulnerability fire high. Vulnerability the appear consequence height density activity, usage equipment electricity in a way intensive, and storage ingredients easy burned. Therefore that, the election object study This based on the level urgency ERP implementation in frame prevent and manage risk fire optimally. Data in journals the show that characteristics physique building, number residents, and types activities carried out participate influence the form and effectiveness of the ERP implemented.

Analysis results against the data in sixth journal the show that ERP implementation on site Work own impact real in lower risks and impacts fire. As For example, research by (Ashari et al., 2023) shows that implementation simulation evacuation regularly in a company manufacturing increase score preparedness from 65% to 89% in time not enough from six month. Increase the No only reflect increasing ability technical in face condition emergency, but also shows existence repair in awareness and attitude employee to procedure safety. While that, a study by (Camelia et al., 2020) in the environment education tall report that with proper ERP preparation standard, time evacuation in the building Sriwijaya University library can pressed from 6 minutes to 3 minutes. Efficiency the achieved through compilation track evacuation reinstall, reinstall tool fire extinguisher fire strategic, as well as training systematic to officers and users building.

Although study This use approach studies library, a number of quantitative data in reviewed articles show existence use instrument relevant measurements. Some journal utilise technique observation direct, *checklist* evaluation ERP readiness, as well as simulation fire as tool measuring effectiveness implementation. Observed variables covering existence ERP documents, completeness equipment protection fire such as APAR, hydrant, and sprinkler, frequency training or simulation fire, level participation employee in exercise, average time evacuation, and level compliance to K3 regulations. Observation results to variable the become base strong in evaluate level readiness of each organization face situation emergency.

In general descriptive, can concluded that organizations that have a complete ERP, the frequency training periodic, and completeness infrastructure protection fire show level more success tall in face incident fire. Building or facilities that meet indicators the tend own time evacuation more short, more participation active from employees, as well as high compliance to protocol safety. One of the findings important from (Ashari et al., 2023) is that " evacuation " indicator under control " increased by 31% after three times simulation fire done in range time six month. This result confirm importance continuity training and not Enough only with depend on existence ERP documents only. Fast and organized response only can formed If all element in system responsive emergency walk in a way integrated.

Although in studies This No done testing statistics in a way explicit Because limitations design research based literature, results data synthesis shows that hypothesis "ERP has an effect to mitigation risk fire " can accepted in a way conceptual and empirical. Each peer- reviewed journal show trend similar : increasingly Good ERP system is implemented, the more low risks and impacts the fire that occurred. With Thus, the discussion end conclude that the existence of ERP is not can Again viewed as document administrative only, but as tool management concrete and operational risks in place work. The effectiveness of ERP in direct influenced by factors like support full from management, ongoing training for all over employees, as well as availability facilities and infrastructure protection adequate fire. Overall findings This strengthen the importance of ERP as one of the main pillars in system safety work based prevention and preparedness.

Table 1. Summary ERP Effectiveness Across Locations

Writer	Location	% ERP Implementation	Evacuation Time	Risk Reduction
(Ashari et al., 2023)	Footwear Company	89%	2.5 minutes	Tall
(Camelia et al., 2020)	UNSRI Library	85%	3 minutes	Currently
(Busra et al., 2023)	PPA Office Building	78%	4 minutes	Tall
(Salihin et al., 2024)	UMS Student Flats	82%	3.2 minutes	Tall

Graph 1. Comparison of Evacuation Time Before and After ERP
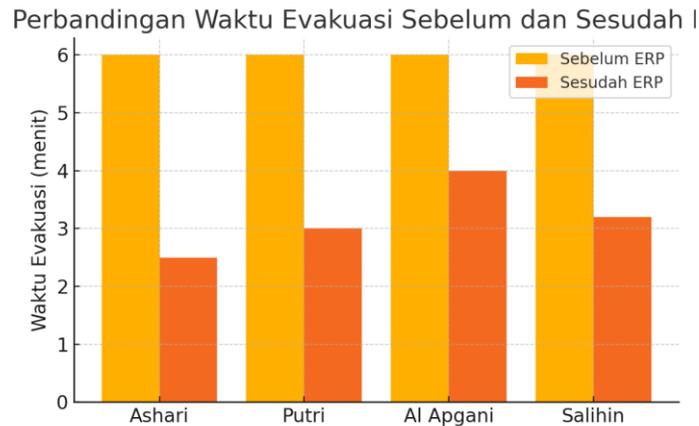
Graph 1 shows existence significant difference in time evacuation between before and after Emergency Response Plan (ERP) implementation in various location work. In the condition beginning without ERP, the average time evacuation is in the range of 6 minutes. After ERP implementation involving training, simulation, and additions infrastructure protection fire, time evacuation experience decline drastically across the board location, with the fastest occurred in a footwear company (2.5 minutes) as studied by (Ashari et al., 2023). This is strengthen argument that ERP is not only document formality, but system practical and capable save life and reduce impact disaster in a way real. Decrease time evacuation also describes improvement coordination and understanding all over personnel Work to procedure responsive emergency.

Success ERP implementation in each object study can seen from consistency exercise evacuation, involvement all work units in simulation, as well as regular evaluation of system protection fire owned. The more ripe ERP planning and implementation, increasingly the potential for loss of life and material losses is also low. happen moment incident fire. With Thus, the integration of ERP into system management safety and health work (K3) must become priority main, especially in the environment work that has potential risk fire high. The existence of ERP that is compiled, simulated, and evaluated in a way periodic will to form culture standby strong disaster in place Work.

CONCLUSION

Study This show that implementation of the Emergency Response Plan (ERP) significant influential in mitigation risk fire on site work. Through training, simulation evacuation, and provision means protection fire, time evacuation can shortened in a way drastically, so that increase preparedness and reduce potential loss of life as well as material loss. This is confirm the importance of ERP as an integral part of system management safety and health work. Implications practical from study This is the need organizations and companies For No only own ERP documents, but also routinely implement simulation and evaluation preparedness all over personnel. Strengthening culture safety through ERP can be an effective strategy in press risk fire and strengthen response emergency.

However, research This own limitations Because based on studies literature of a nature descriptive and not involving testing empirical directly in the field. In addition, variations type place work and level risk different fires Not yet analyzed in a way deep so that generalization results need done with Be careful.

Suggestions for future research is do studies empirical with approach quantitative using primary data from various type industry and location work. Research next also can to study influence factors organization like culture safety, support management, and technology ERP support for effectiveness mitigation risk fire in a way more comprehensive.

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