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Occupational Stress and Its Impact on Health, Safety, and Performance Among Construction Workers in Ghana's Central Region

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***Abstract* - Construction workers experience high levels of stress due to demanding work environments and safety hazards. This stress can negatively impact their health, safety behavior, and overall job performance. This study investigates the factors contributing to occupational stress among construction workers in Ghana's Central Region. It explores the impact of stress on worker health, safety behavior, and performance, focusing on machine and equipment operators, junior engineers, and foremen. A stratified random sampling approach was employed to ensure representativeness across various company sizes. A structured questionnaire was distributed to 150 construction site workers, resulting in a response rate of 74.67%. Descriptive statistics and Principal Component Analysis were used to analyze the collected data. The study identified worker ill-health, role overload, and excessive workload as the leading factors contributing to occupational stress. Dangerous machinery, inadequate safety equipment, and a lack of proper training were found to be significant stressors specific to the construction environment. Furthermore, the study revealed that work-related stress negatively affects employee performance, career advancement, and safety behavior. Psychological consequences, such as difficulty concentrating, and physiological effects, such as headaches, were also prominent. This study highlights the prevalence of occupational stress among construction workers in Ghana and its detrimental effects on their health, safety, and performance. Based on the findings, regular medical check-ups for machine operators and the implementation of shift work schedules to reduce fatigue are recommended. Additionally, acknowledging and rewarding employee contributions can help mitigate stress and improve overall well-being.**
Keywords: **Ghana, Human Aspects, Low Production Levels, Management Concerns, Organization, Safety-Related Behavior, Technical Failures, Programme of Training**

I. INTRODUCTION

Safety has plagued the building industry for many years, with workplace safety being a major issue [1]. Compared with other industries, the construction sector has a higher fatality rate [2]. According to [3], job stress is a primary factor contributing to unsafe behavior, while [4] discovered that it has the greatest detrimental effect on construction employees' safety behavior. Job stress and safety behavior are influenced by factors such as safety culture, one's perception of their own tiredness, and personal traits. Research by [3] indicates that safety behaviors may be negatively impacted by self-perceived exhaustion caused by job stress. Therefore, due to self-perceived weariness, occupational stress might impair employees' safety behaviors [3]. [4] identified several factors contributing to workplace stress among construction employees, including the nature of the work, role management, interpersonal relationships, organizational style, career growth, work-life conflict, high workload, tight turnaround times, excessive responsibility, and hazardous working conditions.

According to the 2020 report from the Canadian Centre for Occupational Health and Safety (CCOHS), stress generally arises when employees feel overwhelmed by their work-related duties. Stress is a response to an external situation. Employees who feel overburdened by their duties frequently experience higher levels of stress, which can negatively impact their productivity. Stress can also affect physical health, with typical symptoms including exhaustion and headaches [5].

According to [4], a study on the development of a scale for measuring job stress among construction workers examined the link between job stress and safety behavior. Construction workers typically operate dangerous machinery and work in complex physical environments. The study proposed that poorly maintained machinery and unsafe equipment directly affect employees' safety behaviors and levels of work-related stress. According to [6], occupational stress negatively impacts employees' health and productivity at work [7]. Continuous, high-level workplace stress has been linked to mental exhaustion, improper posture at work, and dangerous behavior [8], [9], [10], [11].

In a 2020 report, the Canadian Centre for Occupational Health and Safety (CCOHS) outlined some typical physical effects of stress, such as headaches, muscle soreness or tension, chest pain, elevated blood pressure and heart rate, a compromised immune system, tiredness and insomnia, dyspepsia, elevated blood sugar, and increased levels of fatty acids and cholesterol needed for energy generation. Due to the complexity of their activities, many of which take place in challenging and dynamic surroundings or cramped spaces, frontline construction workers experience particularly high levels of job stress. To complete required tasks (such as safety compliance) within limited time and energy, construction workers may reduce their effort and time spent

on safety-related activities (such as safety participation) [12]. As a result, employees who experience high levels of job stress are more likely to decrease their involvement in safety-related activities rather than adhere to safety regulations [12]. To better understand how occupational stress affects construction workers, this study focuses on its causes and how it impacts worker performance. In addition to offering some methods for lowering employee stress, the part that follows gives an overview of work-related stress, employee motivation, and the importance of stress management.

A. Work Stress and Employee Performance

High levels of stress are common among workers in the construction industry, and this stress can cause psychological, physical, and social strain. To treat this disease, sufferers have developed a variety of coping strategies [6]. Stress at work has psychological impacts such as emotions of inadequacy, dissatisfaction with work performance, and tension. Disruptions to regular sleep cycles, difficulties in unwinding after work, and difficulty concentrating are examples of physiological impacts. Strains on relationships, social interactions, and family life are examples of sociological impacts. Drinking alcohol is an unproductive way of dealing with stress, whereas engaging in physical activity, pursuing intellectual interests, and participating in cultural activities are more constructive coping mechanisms [6]. Additionally, stress at work can also affect safety behavior [13].

Workers serve as a driving force for the nation as well as an organizational resource. As employees are a vital driving force in the construction industry, this becomes even more crucial [14]. Organizations are motivated to act competitively by increasing worker productivity [15]. An organization has a downturn and underdevelopment as a result of its unmotivated and passive workforce [15]. According to scientific research, long-term external pressure and burnout may cause hypertension, health issues, and decreased productivity [16].

A study by [17] found that younger employees' performance is significantly influenced by psychosocial factors related to career development, such as the absence of career mentoring and training programmers, whereas older employees are less affected. Poor employee performance puts project work at risk of failure [18]; [14]. Work-related stressors, as identified by [19], include hostile work environments, job instability, pressures from a schedule, workplace dangers, and other factors such as uncontrollable and sedentary tasks. Addressing these stressors is essential to improve worker productivity in any organization [20].

1. Stress Reduction and Performance Enhancement in the Green Economy

Construction workers are susceptible to high levels of occupational stress, leading to significant psychological, physical, and social strain [12]. The integration of sustainable construction methods inherent to a green economy can mitigate these stressors [21]. The integration of a green economy into the construction industry can contribute to work-related stress reduction and provide valuable insights into improving employee motivation and performance. A green economy prioritizes environmental health and sustainability and supports economic growth [22]. A green economy serves as a stabilizer and aids in stress reduction among construction workers [22]. Green construction reduces workers' exposure to hazardous materials and promotes safer work environments, potentially reducing stress-inducing risks [21]. A green economy incentivizes employees to engage in practices aimed at ensuring not only the profitability of firms but also environmental conservation and societal benefits [23]. The innovation-driven nature of green construction represents a learning opportunity that fosters intellectual pursuit [6]. Simultaneously, as organizations within the construction industry adopt green standards, employee roles may shift and expand, enabling them to actively contribute to environmental conservation. Such meaningful work may increase job satisfaction and counteract feelings of inadequacy and dissatisfaction resulting from stress [6]; [23]. Organizations benefiting from a motivated and active workforce due to green practices can increase competition and offset underdevelopment, and downturns from unmotivated workers [15]. Thus, intertwining the principles of a green economy with strategies for reducing work-related stress presents a promising avenue for future research and practical endeavors within the construction industry.

2. Motivation for Stress Management

An unhealthy workplace environment mostly affects younger and less-seasoned employees, which increases absenteeism and has a negative link with job duties [24]. As stated by [25], young employees in the sector need greater motivation to improve their performance. The difficult working circumstances that are put on new and younger employees by superiors are common. Younger workers in the early phases of their careers need ongoing support and praise for their efforts, which can improve their performance [17].

According to [24], younger workers perform worse when they are expected to put in more hours than is necessary and when upper management exhibits untrustworthy and negligent behavior. Younger workers must be compensated monetarily for their contributions and given allowances to maintain their loyalty to the company.

Colleagues and managers must provide social support to employees of various ages and backgrounds. When faced with difficult work conditions, young employees may particularly benefit from peer support, because they may not be accustomed to handling such situations. To remove barriers that hinder employee productivity, organizations must provide a good and encouraging work environment [24].

Stressors that impacted motivation were of more concern to younger workers, while promotions for top performers served as stronger incentives. Less seasoned employees focused more on being acknowledged for their jobs. According to a CCOHS report from 2020, there are several ways to reduce employee work stress, including treating workers fairly and respectfully, recognizing stress signs and symptoms, involving them in decision-making, providing workplace, health and wellness programmes, surveying workers, and focusing on the real cause of stress. The report also recommended that policies be changed to include stress prevention and the promotion of good mental health; that staff receive the necessary training and resources; jobs should be designed to allow for a balanced workload; employee should be given control over their tasks; job demands should be reasonable; and provide interest and varied work as a motivator for stress management.

II. METHODOLOGY

Among construction site workers in Ghana's Central Region, this study looked into the factors that lead to job stress and poor employee performance. Fieldwork was conducted in June 2023 within Cape Coast Metropolis. The target population comprised officers in charge of operating machinery and equipment, younger engineers, and foremen directly involved in operations on a building site.

Stratified random sampling was employed to ensure representativeness. Construction firms within the Central Region were categorized by size (small, medium, and large) and selected using random sampling technique. This approach ensured that workers from various-sized firms were included in the study [26]; [27]. A structured questionnaire was used as the primary data collection tool.

The questionnaire consisted of three sections:

1. *Section 1:* Assessed work stress experiences.
2. *Section 2:* Investigated awareness and control measures for work stress.
3. *Section 3:* Explored motivation factors influencing employee performance.

A total of 150 questionnaires were distributed in person to participants during the fieldwork period. To maximize response rates, researchers contacted construction firms beforehand and explained the study's purpose. Participants were informed about the voluntary nature of their participation and assured of anonymity and confidentiality of their responses. Follow-up efforts were undertaken in October 2023 to retrieve outstanding questionnaires. Out of the 150 distributed, 112 complete questionnaires were received, resulting in a response rate of 74.67%.

The data was analyzed using the Statistical Package for Social Sciences (SPSS) software, a widely used tool for statistical analysis in social science research [28]; [29]. SPSS was chosen due to its user-friendliness, extensive range of statistical tests, and robust data management capabilities [28]. The returned questionnaires were coded within SPSS. Descriptive statistics, including frequencies and percentages, were used to summarize the data. Additionally, a principal component (PC) analysis was conducted for each identified factor. Factor loadings exceeding 0.50 were considered to possess strong factor characteristics and were further analyzed. The response rate of 74.67% might introduce some non-response bias. Future research could aim for a higher response rate by potentially using online survey tools or offering incentives for participation. Next, the findings are shown in the section that follows.

III. RESULTS

This section introduces the Rotated Component Matrix (RCM), Bartlett's Test (BT), and KMO. Tables I and II present the respondents' profiles. The 'age group' of 26–30 years old had the highest prevalence (50.67%), as seen in Table I. This was followed by the age group of 31 to 36 years (28.0%). Those over 41 (2.00%) were the age group with the lowest percentage.

TABLE I THE AGE DEMOGRAPHICS OF THE RESPONDENTS

Age Range in Years	Fq.	(%)
Less than 20	0.00	0.00
20 - 25	21.00	14.00
26 -30	76.00	50.67
31- 36	42.00	28.00
36- 40	8.00	5.33
41 and above	3.00	2.00
Total	150.00	100.00

Note: Fq. is the frequency

Table II lists the roles that diverse responders from different organisations played. The highest frequency (63.33%) was seen among machine or equipment operating officials. Foremen (19.33%) and junior engineers (17.33%) had the lowest percentages, respectively.

TABLE II RESPONDENTS' ROLES IN RELATION TO A PROJECT

The Roles Played in the Project	Fq.	(%)
Officers in charge of operating machinery and equipment	95.00	63.33
Younger Engineer	26.00	17.33
Foreman	29.00	19.33
Total	150.00	100.00

Note: Fq. is the frequency

As depicted in Table III, the mean range of factors affecting occupational stress is observed to be between 3.750 and 4.450, with a corresponding standard deviation (SD) range of 0.630 to 0.883. Interestingly, worker ill health emerges as the most significant factor, with a mean of 4.450 and a standard deviation of 0.747. Additionally, role overload and excessive workload are ranked second and third, respectively, with means of 4.370 and 4.330, and standard deviations of 0.839 and 0.692. Notably, career growth is deemed the least important factor among the 26 elements assessed.

TABLE III FACTORS INFLUENCING THE STRESS AT WORK

Factors	N	M	Std. Dev.	M. Rank
Work task	150	4.27	0.682	4
Unwelcoming environment or workplace	150	4.21	0.788	6
Job Specifications	150	3.96	0.741	20
Conflicting roles	150	4.27	0.857	4
Employee capacities	150	4.05	0.792	15
Poor health of workers	150	4.45	0.747	1
Job performance	150	4.01	0.794	17
Ambiguity	150	3.79	0.856	25
Role overload	150	4.37	0.839	2
Job insecurity	150	4.06	0.697	14
Employees' ability	150	3.85	0.708	23
Interpersonal safety conflicts	150	4.17	0.663	8
Heavy workload	150	4.33	0.692	3
Short time	150	3.87	0.880	22
Excessive responsibility	150	4.11	0.752	9
Unsafe conditions	150	4.11	0.630	9
Safety restrictions	150	4.08	0.700	12
Family-work conflict	150	3.99	0.719	19
Role management	150	4.01	0.660	17
Interpersonal relationships	150	3.85	0.679	23
Organizational style	150	4.09	0.655	11
Career development	150	3.75	0.685	26
Trust issues	150	3.93	0.724	21
Mental fatigue	150	4.18	0.883	7
Awkward working posture	150	4.07	0.808	13
Unsafe behavior	150	4.04	0.776	16

NB: M=Mean and N=Number. The factor having the highest "Mean" among the factors to the lowest was represented by the "Mean Ranking." The variable with the highest value to the lowest was also represented by the "Standard Deviation."

The mean score (MS) for bodily repercussion of stress ranged between 4.210 and 4.550, with SD ranging from 0.702 - 0.973 as revealed in Table IV. According to the survey respondents, muscle tightness or soreness was the most significant factor influencing work-related stress, with a MS of 4.550 and a SD of 0.747. Headache followed closely, with a MS of 4.520 and a SD of 0.702. The third was elevated heart rate and blood pressure, with a MS of 4.480 and a SD of 0.809. It is worth noting that stomach and digestive upset had the least impact.

TABLE IV TYPICAL BODILY REPERCUSSION OF STRESS

Bodily Repercussions	N	M.	Std. Dev.	M. Rank
Headache	150	4.52	0.702	2
Muscle tightness or soreness	150	4.55	0.747	1
Chest discomfort	150	4.41	0.820	5
Elevated heart rate and blood pressure	150	4.48	0.809	3
Suppressed immune system	150	4.43	0.814	4
Fatigue or sleep problems	150	4.39	0.810	6
Stomach and digestive upset	150	4.21	0.973	9
Hyperglycemia	150	4.35	0.882	7
Increased blood cholesterol and fatty acids for energy production	150	4.29	0.902	8

NB: M=Mean and N=Number. The factors with the greatest "Mean" among the variables was shown to have the lowest "Mean Ranking." The "Standard Deviation" likewise represented the factor with the highest value to the lowest.

As shown in Table V, the stress at work on workers was found to have MS of 4.010 - 4.240 and SD of 0.536 - 0.748. The most important effect, according to respondents, is hindrance to career advancement. The factor yielded SD of 0.7480 and MS of 4.240. The next effect, with a MS of 4.210 and a SD of 0.597, was endangering of workers well-being. Out of the five elements, the least effect was significantly impacting safety compliance.

TABLE V EFFECTS OF STRESS AT WORK ON WORKERS

Effects of Stress	N	M.	Std. Dev.	M. Rank
Endangers worker well-being	150	4.21	0.597	2
Impairs worker productivity	150	4.15	0.536	3
Hinders career advancement	150	4.24	0.748	1
Erodes safe work practices	150	4.08	0.650	4
Significantly impacts safety compliance	150	4.01	0.660	5

NB: M=Mean and N=Number. The factor with the greatest "Mean" among the factors was shown to have the lowest "Mean Ranking." In addition, the factor with the highest value to the lowest was represented using the "Standard Deviation."

Table VI displays the recorded ranges for the psychological, physiological, and sociological impacts of occupational stress: 3.550 to 4.060 and 0.553 to 0.825 for the standard deviation. One of the most important factors that respondents ranked among the psychological, physiological, and sociological repercussions of occupational stress was trouble concentrating. The component yielded a SD of 0.647 and a MS of 4.060. With a MS of 4.050 and a SD of 0.606, work anxiety came second. The inability to unwind after hours came in third, with a MS of 4.040 and a SD of 0.750. Out of the nine elements affecting the psychological, physiological, and sociological repercussions of occupational stress, the strain on family life was the least significant.

TABLE VI WORKPLACE STRESS'S PHYSIOLOGICAL, PSYCHOLOGICAL, AND SOCIOLOGICAL IMPACTS

Impacts of Stress	N	M.	Std. Dev.	M. R
Psychological Effects				
Lack of recognition	150	3.78	0.703	5
Low job satisfaction	150	3.68	0.698	8
Work anxiety	150	4.05	0.606	2
Physiological Effects				
Social relationships	150	3.71	0.606	7
Sleep problems	150	3.90	0.553	4
Difficulty unwinding	150	4.04	0.750	3
Attention difficulties	150	4.06	0.647	1
Sociological Effects				
The strain on family life	150	3.55	0.791	9
Social activities	150	3.76	0.825	6

NB: M=Mean and Number

Table VII shows the factors influencing employee performance. The ranking shows that positive and supportive work environment has greater influence on employee performance. This was followed by highlighting and celebrating exceptional performance and recognition and acknowledgement for accomplishments with MS of 3.810 and 3.780 and 0.808 and 0.810 SD.

TABLE VII MOTIVATING FACTORS INFLUENCING EMPLOYEE PERFORMANCE

Factors	N	M.	Std. Dev.	M. Rank
Advancement opportunities tied to performance	150	3.60	0.955	8
Recognition and acknowledgment for accomplishments	150	3.78	0.810	3
Reduced pressure from leadership	150	3.75	0.853	5
Improved work-life balance	150	3.65	0.827	7
Attribution for individual contributions	150	3.75	0.868	5
Increased collaboration and teamwork during challenges	150	3.77	0.908	4
Highlighting and celebrating exceptional work	150	3.81	0.808	2
Positive and supportive work atmosphere	150	4.05	0.789	1

NB: M=Mean and N=Number. The factor with the greatest "Mean" among the factors was shown to have the lowest "Mean Ranking." In addition, the factor with the highest value to the lowest was represented using the "Standard Deviation."

A. KMO and Bartlett's Test (BT) for Factors That Can Cause Stress

Kaiser-Meyer-Olkin metric (KMO) was 0.712, and had a p-value larger than 0.05, meaning that the sample adequacy metric is not reliable. At the significance threshold of 0.05, BT of sphericity will likewise be disregarded. As Table VIII illustrates, the correlation matrix is therefore not an identity matrix since its p-value is less than 0.05.

TABLE VIII KMO AND BT FOR FACTORS THAT INFLUENCE WORK STRESS

KMO of Sampling Adequacy		0.712
BT of Sphericity	Approx. Chi-Square	3047.603
	Df	325
	Sig.	0.000

Factor loadings for the components (1, 2, 3, and 4) range from 0.407 to 0.844, as indicated in Table IX. Factor loadings for

only two of the variables in component 3 were below the required minimum of 0.50. The factor loadings for component 1 were between 0.679 and 0.807; for component 2, they were between 0.535 and 0.767; for component 3, they were between 0.407 and 0.705; and for component 4, they were between 0.551 and 0.844. Therefore, it was discovered that nearly every variable had characteristics that could affect work-related stress. Work-life imbalance was identified as the most influential stress-inducing factor among the 26 explanatory variables.

TABLE IX ROTATED COMPONENT MATRIX FOR STRESS-INDUCING FACTORS AT WORK

Stress-Inducing Factors	Component			
	1	2	3	4
Toxic work culture	0.683			
Work design	0.807			
Conflicting demands	0.681			
Employee skills & abilities	0.790			
Worker well-being	0.713			
Work productivity	0.679			
Role overload	0.771			
Job insecurity	0.690			
Employees' ability	0.742			
Work task		0.535		
Heavy workload		0.767		
Excessive responsibility		0.617		
Mental fatigue		0.740		
Ergonomic hazards		0.723		
Workplace violence			0.436	
Unclear expectations			0.659	
Leadership style			0.705	
Career progression opportunities			0.534	
Lack of trust			0.569	
Risky work practices			0.637	
Role clarity			0.407	
Time pressure				0.591
Hazardous work environment				0.551
Safety regulations				0.723
Work-life imbalance				0.844
Workplace relationships				0.561

Note: Analysing principal components is the extraction method. Varimax with Kaiser Normalization is the rotation method used.

It took 11 iterations for the rotation to converge. Analysing principal components is the extraction method. Varimax using Kaiser's rotation technique is called normalization.

B. KMO and Bartlett's Test (BT) for Performance-Related Motivation Elements of Employees

The KMO was 0.888, and the p-value was larger than 0.05, meaning that the sample adequacy metric is not reliable. At the significance threshold of 0.05, BT of sphericity will likewise be disregarded. As Table X illustrates, the correlation matrix is therefore not an identity matrix since its p-value is less than 0.05.

TABLE X KMO AND BT FOR THE PERFORMANCE-RELATED MOTIVATION ELEMENTS OF EMPLOYEES

KMO of Sampling Adequacy		0.888
BT of Sphericity	Approx. Chi-Square	816.185
	Df	28
	Sig.	0.000

Table XI presents the factor loadings for the performance-related motivation elements of employees. The factor loadings of all the variables (components 1 and 2), as shown in Table XI, range from 0.626 to 0.920 over the minimum

threshold, demonstrating stronger factor loadings. The creation of a work environment where every worker feels less stressed by management expectations was discovered the most significant variable among performance-related motivation elements.

Factor loadings for Component one ranged from 0.626 - 0.838, while Component two factor loadings ranged from 0.653 to 0.920. As a result, every factor in Table XI has the potential to affect how well employees perform.

TABLE XI RCM FOR THE PERFORMANCE-RELATED MOTIVATION ELEMENTS OF EMPLOYEES

Elements	Component	
	1	2
Minimize the amount of work required to complete tasks.	0.728	
Acknowledge and reward employees for their achievements.	0.626	
Encourage teamwork and mutual assistance during challenging times.	0.838	
Showcase and celebrate outstanding employee accomplishments.	0.784	
Foster a supportive and productive work atmosphere.	0.807	
Advance employees based on their demonstrated skills and contributions.		0.653
Regularly acknowledge and express gratitude for employee efforts.		0.732
Create a work environment where employees feel less stressed or overwhelmed by management expectations.		0.920

Note: Analysing principal components is the extraction method. Varimax with Kaiser Normalization is the rotation method used.
a. After three repetitions, the rotation converged.

IV. FINDINGS AND DISCUSSION

The majority of the participants were younger people involved in machine or equipment operations; their ages ranged from 26 to 30. This implies that they were still maturing, which may have made them more vulnerable to the negative impacts of stress at work. This study discovered that the most influential factors that affected job stress were poor health among workers, role overload, heavy overload, work tasks, conflicting roles and duties, an unfavorable workplace environment, and mental fatigue. Researchers [4], [3], and [30] identified the workers' poor health as the primary cause. The most typical physical consequences of stress include muscle tightness or soreness, headaches, elevated heart rate and blood pressure, a suppressed immune system, chest discomfort, and fatigue or sleep problems.

The study discovered that stress at work had a detrimental effect on workers' safety behavior, hindered their advancement at work, and had a major influence on their health. According to [11], [7], [9], [10], [6], and [8], the most significant consequence was slow progress at work. It was discovered that tension at work, trouble focusing, and social activities were the psychological, physiological, and sociological impacts of occupational stress, in that order. This outcome agrees with the conclusions of [6]. The study found that employees performed better when they implemented adequate and effective measures for their daily routines and provided a healthy work environment. Additionally, they worked better when given encouragement and gratitude. The findings of [25], [17], and [24] are all in line with this outcome.

V. CONCLUSION AND RECOMMENDATIONS

This study examined the impact of occupational stress on construction workers in Ghana's Central Region. The high prevalence of ill health was one of the factors influencing work-related stress. Employee safety behavior has been impacted by job stress, which has typically resulted in poor advancement at work. The pressure on employees made it extremely difficult for them to focus on their responsibilities. To ensure their fitness for duty, it is advised that workers have routine medical examinations. It is recommended that employees undergo routine medical examinations to guarantee their readiness for duty. Managers should ensure that employees work in shifts to allow them sufficient time to recuperate prior to their subsequent duty period. In addition, it is imperative for management to acknowledge and incentivise diligent staff.

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