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GENERAL MANAGEMENT

The Failure Mode and Effect Analysis of Tender for Construction Companies in Indonesia

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Abstract

This study analysed the factors influencing the failure to win the tender with a risk management approach. Data were collected from 75 national-level construction companies to be involved in a failure risk assessment based on the criteria for severity, occurrence and detection scores. The dominant factor is viewed from tender documents and estimates. The failure mode and effect analysis (FMEA) method was used to identify the highest risk dominant factor. The study results indicate critical factors and become a priority for immediate improvement. (1). A tender document can be identified based on the following factors: (a). The basic design: compliance with the scope of work; detailed design; detail on the scope of work; the implementation schedule; (b). The scope of work: detail in the work area; (c). The schedule: the implementation schedule. (2). The estimation can be identified based on the following reflective indicators: (a). The estimator does not understand the scope of work; (b). Estimates are less competitive and tend to be underpriced; (c). The tender value being overpriced or underpriced; (d). Marketing ability.

Keywords: *Tender failure, Risk Priority Number, Failure Mode and Effect Analysis.*

Introduction

One of the tender functions is to minimise business risks such as fraud amid cooperation (Setiani et al., 2017; Ferwerda et al., 2017) because tenders are business activities that must be transparent and open (Tajarlou & Darabad, 2017). The tender system is more suitable than the contract system because of the weaknesses and differences in the bidding phase (Myint & Thein, 2018). Australia and New Zealand's Tender Training Specialist stated ten practical strategies for winning tenders, including meeting the tender requirements and client objectives (Tender Training College, 2020). Islamy et al. (2020) explained that the legal position of the government's procurement of goods and services has a solid legal basis, both from civil law and administrative law. Niewerth et al. (2022) add that public procurement policymakers in Europe have ordered the inclusion of various criteria, such as price, life cycle, cost, environmental and social aspects, in evaluating tenders for public construction projects. In Indonesia, tenders are carried out for the procurement of goods/services to be effective, transparent, open, competitive, fair/non-discriminatory, and accountable (Herman & Yohannis, 2018; Arifin, 2020). Based on the Presidential Regulation of the Republic of Indonesia No. 12 of 2021 concerning the Procurement of Government Goods/Services, it is stated that the procurement of goods/services is an activity of procuring goods/services by ministries, institutions, regional apparatuses financed by the State/ Local government budget whose process starts from the identification of needs until the handover of the work. The procurement of services can be through a tender/selection, including implementation of qualifications, announcements and or invitations, registration and retrieval of election documents, briefing, bidding documents, evaluation bidding documents, determination and information of winners, and argument.

Becoming a winner in a tender is one of the goals of companies engaged in procuring goods/services for the construction industry. For providers, especially for the procurement of construction and services, to offer goods/services efficiently, the provider must have advantages in human resources, methodology, innovation, technology, and even intellectual property rights (Sutisna, 2019). It was also added that being the winner of the tender means that the project owner or user has gained trust in the capacity, management and capability to realise the project object. There is a long process that must be passed and requires dedication, professionalism, commitment, integrity, struggle, and even having experienced previous failures due to various mistakes that may be made.

Joko Widodo, President of the Republic of Indonesia, stated that infrastructure development could have a multiplier effect on the economy when it is built and completed (Alika, 2019). Furthermore, it was added that infrastructure development was carried out very massively to connect regions in Indonesia to boost national economic activities. It is recorded that from 2016 to November 2021, the Government of the Republic of Indonesia has completed 124 national strategic projects with a total investment of Rp. 626.1 trillion involves funding from private business entities, state-owned enterprises and the state budget. Furthermore, Annur (2021) explained that some of the achievements in the infrastructure sector in 2021 are the construction of 10,706 flats and unique houses, 53 dams, 965.4 kilometres of roads, and 26.9 kilometres of bridges and railway lines. 446.56 kilometres of fire, and ten airports/locations. There is also the construction of a natural gas network for households

of 120,776 house connections and a Rooftop Solar Power Plant, and a Cold Storage Solar Power Plant of 11.8 MegaWatt-peak. The planning of various construction project needs that must be realised immediately has resulted in many national scale construction companies being involved and competing in winning the construction project tender. Based on the Central Statistics Agency database, Indonesia's construction companies reached 203,403 business units, with 38% located in Java and the rest outside Java. Only one winner will be obtained in implementing the tender, and the other participants will experience failure. With the fact that generally, every construction company must have experienced neglect, it is necessary to research the analysis of the dominant factors that cause loss to win tenders with risk management.

Theoretical review

Even if high-quality control is exercised, any product may have inherent weaknesses that fail (Kiran, 2017; Niu et al., 2018). Instead of analysing why a failure occurred as a postmortem, it is always necessary to anticipate failure by providing corrective action during the design phase. FMEA was developed in the United States Military. Military Procedure MIL-P-1629, entitled Procedures for Performing a Failure Mode, Effects and Criticality Analysis, dated November 9, 1949. FMEA is a formal design methodology in the 1960s by the aerospace industry, with apparent reliability and safety requirements. In the late 1970s, Ford Motor Company introduced FMEA to the automotive industry for safety and regulatory considerations (Sharma & Srivastava, 2018). In its application, analysis is carried out to find effects or impacts that are likely to make mistakes in a product or the production process. The stages in preparing the FMEA consist of identifying potential failures in each cycle, identifying the frequency of a problem, placing the control system, calculating the risk priority number, and determining several corrective steps. Furthermore, in the broader, FMEA can be applied to assess improvement steps on the more general development method is applied by conducting a risk assessment using three critical stages, the severity with an evaluation of the level of impact of the problem, occurrence by analysing how often the cause of errors occurs and detection by researching the ability of the product or process control to detect the cause of the problem or failure mode. (Stamatis, 2019; Velasquez, et al., 2021).

Research Method

The data collection method was carried out by distributing questionnaires to 75 national-level construction companies, containing questions related to the risk assessment of failure to win the tender (risk assessment). The evaluation is based on referring to the failure mode and effect analysis (FMEA) with criteria for severity score, criteria for occurrence score and criteria for detection score, expressed by a numerical scale (score) consisting of the numbers 1 to 5 (Sharma & Srivastava, 2018; Velasquez et al., 2021).

The following presents the value criteria used in the questionnaire:

Score	Rating	Qualitative description
1	Tolerable bad influence	There is a violation of procedures, causing minor consequences, and does not cause the company to be disqualified.
2	Mild severity	A procedural violation occurred; they met the requirements but were not invited to attend the clarification.
3	Moderate severity	There was a procedural violation; a clarification was invited but found things that could not be accounted for so that, according to the project owner, the document was flawed.
4	High severity	There was a procedural violation; the conditions were met, and it was included in the classification, but the clarification and negotiation team was unable to explain in detail the intent of the bid document.
5	Potential severity	A procedural violation occurred; they did not meet the requirements as a tender participant and were disqualified.

Table I. Criteria for severity score
Sources: (Sharma & Srivastava, 2018; Stamatis, 2019; Velasquez, et al., 2021)

Score	Rating	Qualitative description
1	Extremely Improbable	Occurs at least once in 30 tenders
2	Extremely Remote	Occurs at least once in 15 to 29 tenders
3	Remote	Occurs at least once in 7-14 tenders
4	Reasonably Probable	Occurs at least once in 3 to 6 tenders
5	Frequent	This happens every time participate in a tender

Table II. Criteria for occurrence score
Sources: (Sharma & Srivastava, 2018; Stamatis, 2019; Velasquez, et al., 2021)

Score	Qualitative description
1	Prevention is very effective. No possible causes can arise.
2	Effective prevention. Low probability of occurrence
3	Possible causes of occurrence are moderate. Prevention methods sometimes still allow the reason to appear.
4	The probability of this happening is still high. Prevention methods are less effective. Cause it keeps coming back
5	The possibility of this happening is still very high. Prevention methods are not effective. The cause is still recurring.

Table III. Criteria for detection score
Sources: (Sharma & Srivastava, 2018; Stamatis, 2019; Velasquez, et al., 2021)

The principle behind the failure mode and effect analysis details several aspects: a function of the three parameters, the severity of the failure effect, the probability of occurrence, and the ease of detection for each failure mode (Kiran, 2017). The analysis is carried out to identify the risk priority number factor that causes tender failure and becomes a priority for immediate improvement. In this study, the variables used to refer to the need for tender implementation based on the Presidential Regulation of the Republic of Indonesia No. 12 of 2021 concerning the Procurement of Government Goods/Services, where the potential for failure is found in the variables consisting of:

Tender Documents

This variable is described in terms of several relevant factors measured using reflective indicators and failure events, as presented in Table IV as follows:

No	Factor	Reflective indicator	Failure event
1	Specification	Lack of tender document specifications	Lack of information on the requested contract specifications
			Lack of employer experience
			Contract documents are incomplete/detailed (unclear)
			Lack of experts, because the time provided is limited
	Basic design	Not by the scope of work	The maturity level of the design is not fully available at the time of tender.
		Lack detailed design	Late submission of tender documents
			Lack of time for design preparation or less data for design and others
			Changes in field data, such as previously unknown underground conditions
3	Scope of work	The lack of details on the size of the work	The scope of work does not match the drawings and specifications.
			The boundaries of the scope of work are not clear in terms of material.
4	Schedule	The implementation schedule from the owner is not realistic	Inaccurate calculations and lack of competence and experience from the owner

Table IV. Tender document variables, reflective indicators and failure events

Estimate

In this variable, relevant human resource factors are used to measure reflective indicators and failure events, as presented in Table V as follows:

No	Factor	Reflective indicator	Failure event
1	Human Resources	An estimation error occurred	The estimator does not understand the scope of work.
			The estimator does not understand in reading material and work specifications.
			The estimator does not analyse the unit price of each job.
			The estimator does not make a checklist of data requirements for calculations.
		Estimates do not match the actual conditions in the field	The estimator does not conduct a site visit to understand the location condition
		Estimates are lack competitive and tend to be underpriced	The estimator does not review the required resources
			The estimator does not make a work schedule at the tender time.
		Tender value becomes overpriced or underpriced.	Lack of qualified personnel in the calculation of tenders
			Minimal tender calculation time
			The estimator does not ask for bid prices from suppliers or sub-contractors
			The estimator does not include price fluctuations in the market.
		Lack of marketing skills	Failed in bidding
			Failed in negotiations
			Failed in prequalification

Table V. Estimated variables, reflective indicators and failure events

Risk priority number

Various risk estimates can be calculated using the RPN formula (Sharma & Srivastava, 2018; Stamatis, 2019). A risk priority number is a number obtained from the multiplication of severity (S), occurrence (O), and detection (D), with the following equation:

$$\mathrm{RPN} = \mathrm{S} \times \mathrm{O} \times \mathrm{D}$$

Where S is the severity of the failure effect, O is the probability of failure, and D is the ease of detection. This formula calculates the reflective indicator RPN of each measured variable. First, to get the highest RPN value, the total risk priority number (RPN) value is calculated by calculating the average RPN value of each indicator. Next, the critical risk priority number (RPN) is calculated by getting the average of the total RPN values. Based on comparing the RPN of each indicator and the critical RPN, identifying the highest form of failure will be obtained according to the RPN rating. The RPN is higher than the essential RPN, indicating a crucial and requiring immediate corrective action (potential loss) to improve performance. The failure rate in winning tenders in the future can be minimised.

Results And Discussion

In the construction company studied, the research variables determined for the tender document consist of specification factors, basic design, work scope, and schedule; In contrast, the factor estimation consists of human resources (HR). The respondents' assessments' average data was nuts were then analysed using the failure mode and effects analysis (FMEA) method. The identification step begins with the input in the form of the results of the respondent's assessment of the risk assessment of the criteria for the severity of the effects of failure (severity), the requirements for the probability of failure (occurrence), and the requirements for ease of detection (detection). As for the output, critical indicators are obtained in the variables of tender documents and estimates to get priority for immediate improvement. The result is a crucial indicator that gets priority for immediate improvement. After revision, it can then be re-evaluated and become input for continuous improvement to be analysed again until indicators are not critical and do not require immediate modification. Based on the respondent's assessment data, it is then used as input for calculating the Risk Priority Number (RPN) consisting of RPN indicator, RPN total and RPN critical, as shown in Table 6.

Based on the analysis using the failure mode and effect analysis (FMEA) method as presented in Table VI, the identification results were obtained by evaluating the indicator RPN value, which was more significant than the critical RPN.

In the first variable, the tender document variable, the dominant factor analysis can be identified based on the reflective indicators and the failure event, consisting of:

In the specification factor, the total risk priority number (RPN) = 14.12 is smaller than the critical RPN = 18.43. This is a non-critical factor and is not a priority for immediate improvement.

In the primary design factor, the total RPN for each indicator can be explained as follows:

Not by the scope of work with a total RPN = 19.14 greater than the critical RPN = 18.43. This is critical; it needs immediate improvement because there is a failure if the design maturity level is not fully available at the tender time.

The design is less detailed with a total RPN = 19.14, more significant than the critical RPN = 18.43. This is critical; urgent improvement is needed due to failure in the event of lack of time for design preparation or lack of data for design and others, and the possibility of changes in field data, such as unknown underground conditions.

In the work scope factor, the total RPN = 19.93 is greater than the critical RPN = 18.43. This is critical; immediate improvement is needed because there is a failure in the lack of detail of the scope of work if the boundaries of the area of work are not clear in terms of material.

In the schedule factor, the total RPN = 19.84 is greater than the critical RPN = 18.43. This is critical; immediate improvement is needed because there is a failure in the implementation schedule from the owner, which is unrealistic in the event of an inaccurate calculation and a lack of competence and experience from the owner.

In the estimation variable, relevant human resource factors measure the reflective indicators and failure events. The same analysis method is then used as input to calculate the risk priority number (RPN) consisting of RPN indicator, RPN total and RPN critical, as shown in Table VII.

No	Factor	Reflective indicator	Failure event	Average Risk assessment				RPN Total	Critical RPN	Information
				Severity	Occurrence	Detection	RPN			
1	Specification	Lack of tender document specifications	Lack of information on the requested contract specifications	2,40	2,10	2,50	12,60	14,12	18.43	Not critical
			Lack of employer experience	2,60	2,65	2,60	17,91			Not critical
			Contract documents are incomplete/detailed (unclear)	2,35	2,40	3,20	18,05			Not critical
			Lack of experts, because the time provided is limited	1,80	2,20	2,00	7,92			Not critical
2	Basic design	Not by the scope of work	The maturity level of the design is not fully available at the time of tender	3,00	2,20	2,90	19,14	19,14		Critical
		Lack detailed design	Late submission of tender documents	2,15	2,45	2,90	15,28	19,14		Not critical
			Lack of time for design preparation or less data for design and others	2,90	2,90	2,70	22,71			Critical
			Changes in field data, such as previously unknown underground conditions	2,85	2,35	2,90	19,42			Critical
3	Scope of work	The lack of details on the size of the work	The scope of work does not match the drawings and specifications	2,65	2,25	2,95	17,59	19,93		Not critical
			The boundaries of the scope of work are not clear in terms of material	2,75	2,70	3,00	22,28			Critical
4	Schedule	The implementation schedule from the owner is not realistic	Inaccurate calculations and lack of competence and experience from the owner	2,90	2,40	2,85	19,84	19,84		Critical

Table VI. The results of the calculation of the risk priority number (RPN) based on the results of respondent's assessments of tender failures on the tender document variable

Source: Processed data (2022)

No	Factor	Reflective indicator	Failure event	Average Risk assessment				RPN Total	Critical RPN	Information
				Severity	Occurrence	Detection	RPN			
1	Human Resources	An estimation error occurred	The estimator does not understand the scope of work	3,10	3,10	3,00	28,83	22,35	23,08	Critical
			The estimator does not understand in reading material and work specifications	2,30	2,85	3,05	19,99			Not critical
			The estimator does not analyse the unit price of each job	2,10	3,10	2,50	16,28			Not critical
			The estimator does not make a checklist of data requirements for calculations	2,70	3,05	2,95	24,29			Critical
		Estimates do not match the actual conditions in the field	The estimator does not conduct a site visit to understand the location condition	3,10	2,45	2,40	18,23	18,23		Not critical
		Estimates are lack competitive and tend to be underpriced	The estimator does not review the required resources	2,90	3,25	3,05	28,75	27,93		Critical
			The estimator does not make a work schedule at the time of the tender	3,30	3,10	2,65	27,11			Critical
		Tender value becomes overpriced or underpriced	Lack of qualified personnel in the calculation of tenders	2,50	3,30	3,15	25,99	23,66		Critical
			Minimal tender calculation time	2,75	2,85	3,40	26,65			Critical
			The	2,40	3,55	3,10	26,4			Critical

			estimator does not ask for bid prices from suppliers or sub-contractors				1			
			The estimator does not include price fluctuations in the market	2,25	2,35	2,95	15,60			Not critical
		Lack of marketing skills	Failed in bidding	2,80	3,45	2,70	26,08	23,25		Critical
			Failed in negotiations	3,15	2,50	2,45	19,29			Not critical
			Failed in prequalification	2,60	3,35	2,80	24,39			Critical

Table VII. The results of the calculation of the risk priority number (RPN) based on the results of the respondent's assessment of the failure of the tender on the estimated variable
Source: Processed data (2022)

The estimation variables on the human resource factor, as shown in Table VII, can be identified based on reflective indicators and the occurrence of failure events, consisting of:

1. In the first reflective indicator, the occurrence of estimation errors, which can be evaluated based on 4 (four) critical events of failure to win the tender, each described as follows:

a. The estimator does not understand the scope of work with the indicator RPN = 28.83, which is greater than the critical RPN = 23.08. This is critical and requires immediate improvement priority.

b. The estimator lacks an understanding of reading material and work specifications with an indicator RPN = 19.99, which is smaller than the critical RPN = 23.08. This is not critical, so it does not fall into the priority for immediate improvement.

c. The estimator does not analyse the unit price of each job with the indicator RPN = 16.28 which is smaller than the critical RPN = 23.08. This is not critical, so it does not fall into the priority for immediate improvement.

d. The estimator does not make a checklist of data requirements for calculations with the indicator RPN = 24.29, which is greater than the critical RPN = 23.08. This is critical and requires immediate improvement priorities.

2. In the second reflective indicator, the estimate does not match the actual conditions in the field, can be identified based on the failure event, the estimator does not conduct a site visit to understand the situation of the location, the total risk priority number (RPN) = 18.23 is smaller than the critical RPN = 23, 08. This is not critical and is not a priority for immediate improvement.

3. In the third reflective indicator, the estimation is less competitive and tends to be underpriced, which can be evaluated based on 2 (two) critical events, each described as follows:

a. The estimator did not make a review of the required resources with a total RPN = 28.75, more significant than the critical RPN = 23.08. This is critical and requires immediate improvement priorities.

b. The estimator does not make a work schedule at the time of the tender with a total RPN = 27.11, which is greater than the critical RPN = 23.08. This is critical and requires immediate improvement priorities.

4. In the fourth reflective indicator, the tender value becomes overpriced or underpriced, which can be evaluated based on 4 (four) critical events, each described as follows:

a. The lack of qualified personnel in the tender calculation with RPN indicator = 25.99 is greater than the critical RPN = 23.08. This is critical and requires immediate improvement priorities.

b. Tender calculation time is minimal with indicator RPN = 26.65, which is more significant than critical RPN = 23.08. This is critical and requires immediate improvement priorities.

c. The estimator does not ask for bid prices from suppliers or sub-contractors with an indicator RPN = 26.41 greater than the critical RPN = 23.08. This is critical and requires immediate improvement priorities.

d. The estimator does not include the factor of price fluctuations in the market with the indicator RPN = 15.60, which is smaller than the critical RPN = 23.08. This is not critical and is not a priority for immediate improvement.

5. In the last reflective indicator, the lack of marketing ability, which can be evaluated based on 3 (three) critical events, each described as follows:

a. Failed bidding with the indicator RPN = 26.08, more significant than the critical RPN = 23.08. This is critical and requires immediate improvement priorities.

b. Failed in negotiations with the indicator RPN = 19.29, smaller than the critical RPN = 23.08. This is not critical and is not a priority for immediate improvement.

c. Failed in prequalification with indicator RPN = 24.39, which is more significant than critical RPN = 23.08. This is critical and requires immediate improvement priorities.

In general, by obtaining indicators on the dominant factors that cause failure in winning tenders, the failure mode and effect analysis (FMEA) method can be used as a tool to monitor a direction of improvement that can be developed for construction companies to minimise the risk of failure in the future. Excellent and targeted risk management will further spur competitiveness on how competitive advantage must continue to be developed. Following are the results of the analysis based on a review of

the potential risks of failure that can be observed in Table VIII below:

No	Potential factor	Reflective indicator	Failure event	Suggestions for improvement
1	Basic design	Not by the scope of work	The maturity level of the design is not fully available at the time of tender.	Check the list of all design requirements according to the scope of work.
		Lack of detailed design	Lack of time for design preparation or lack of data for design and others	Complete-time management and data input
			Changes in field data, such as previously unknown underground conditions	Observation and analysis of potential field data
2	Scope of work	The lack of details on the size of the work	The boundaries of the scope of work are not clear in terms of material	Job description and maintain material supply chain
3	Schedule	The implementation schedule from the owner is not realistic	Inaccurate calculations and lack of competence and experience from the owner	Training to improve competence and available experts
4	Human Resources	An estimation error occurred	The estimator does not understand the scope of work	Work breakdown structure carefully and completely
			The estimator does not make a checklist of data requirements for calculations.	Complete monitoring and checklist for all data needs
		Estimates are lack competitive and tend to be underpriced	The estimator does not review the required resources	Review all the required resource requirements
			The estimator does not make a work schedule at the time of the tender	Project implementation schedule performance management
		Tender value becomes overpriced or underpriced.	Lack of qualified personnel in the calculation of tenders	Competency and skill-based qualifications
			Minimal tender calculation time	Time and experts management
			The estimator does not ask for bid prices from suppliers or sub-contractors	Cooperating with suppliers and upgrading prices
		Lack of marketing skills	Failed in bidding	Practical training and methods in bidding
			Failed in prequalification	Fulfilment of hard skills and soft skills required in the selection

Table VIII. Factors with high failure potential get priority for immediate improvement

Based on the presentation in Table VIII, the factors that have the potential to experience high failure and based on the proposed improvements will then be able to evaluate the reduction in the potential risk of loss. After the repairs are made, then using the same method, a risk assessment is carried out so that a risk priority number (RPN) will be generated (Stamatis, 2019). Thus the reduction in the potential risk of failure can be calculated by the following equation:

$$Potential \text{ risk reduction} = \frac{(\text{Initial RPN} - \text{Repair RPN})}{\text{Initial RPN}} \times 100\%$$

With the improvement efforts that have been made to indicators with a high potential risk of failure, a possible reduction in risk will be obtained. Effective repairs can be carried out until the critical properties become non-critical and are not a priority for immediate improvement (Velasquez et al., 2021). Even more broadly, the analysis of the dominant factors that have the potential to cause the risk of failure can also be applied to service functions that involve a large number of customers. With the improvement steps, the level of customer satisfaction will also increase. Based on customer needs identification, the accuracy level required for repairs will improve effectiveness and accuracy. Various customer satisfaction surveys identify which dominant factors are less satisfying so that immediate improvement priorities are needed. This process is carried out continuously until optimal repair results are obtained.

Conclusion

Based on the analysis of the dominant factors that influence the failure to win a tender with a risk management approach, conclusions can be drawn as follows:

Failure to win a tender caused by a tender document can be identified based on the following factors:

A specifications are not critical and are not a priority for immediate improvement.

In the basic design, critical reflective indicators can be identified and become a priority for immediate improvement:

Lack of compliance with the scope of work occurs when the

design maturity level is not fully available at the tender time.

Lack of detailed design occurs in the event of a lack of time for design preparation or lack of data for configuration and changes in field data such as unknown underground conditions.

The lack of detail on the scope of work occurs if the boundaries of the work area are not clear in terms of material.

The implementation schedule from the owner is not realistic when it occurs when the calculation is less accurate and the owner lacks competence and experience.

In the scope of work, it can be identified the lack of detail in the area of work is critical and becomes a priority for immediate repairs and occurs when the boundaries of the scope of work are not clear in terms of material.

In the schedule, it can be identified that the implementation schedule from the owner is unrealistic, which is critical and becomes a priority for immediate repairs and occurs in the event of an inaccurate calculation and lack of competence and experience from the owner.

The failure to win the tender caused by the estimation (construction project cost estimate) on the human resource factor can be identified based on the following reflective indicators:

Estimation error can be identified as critical and becomes a priority for immediate improvement, which happens when the estimator does not understand the scope of work and the estimator does not make a checklist of data requirements for calculations.

Estimates that are not by actual conditions in the field are not critical and are not a priority for immediate improvement.

Estimates that are less competitive and tend to be underpriced can be identified as critical and a priority for immediate improvement. This occurs when the estimator does not review the required resources and the estimator does not make a work schedule at the time of the tender.

The tender value being overpriced or underpriced can be identified as critical and a priority for immediate repairs; this occurs in the event of a lack of qualified personnel in the calculation of tenders, the time for calculating tenders is minimal, and the estimator does not ask for bid prices from suppliers or sub-contractors.

Lack of marketing ability can be identified as critical and a priority for immediate improvement, occurs in the event of failed bidding and failed prequalification.

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