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Evaluation of Bridge Superstructure Capacity under Traffic Loading

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ABSTRACT

The Krueng Raba Bridge, located on the Banda Aceh–Meulaboh corridor, is a vital transport infrastructure subjected to high traffic loads, requiring reliable superstructure performance under varying loading conditions. This study addresses the lack of a comprehensive evaluation of the steel truss capacity under increasing actual traffic loads. Its novelty lies in applying an incremental loading approach to determine the maximum structural capacity up to near-failure conditions, in accordance with current national standards. This study aims to evaluate the load-carrying capacity of the bridge superstructure under traffic loading. The analysis adopts the Load and Resistance Factor Design (LRFD) method. Structural modeling and analysis were performed using SAP2000, involving model development, application of standard loads, and incremental loading simulations until the structural capacity limit was reached. Results indicate that the truss weight is 75.681 tons, with a total structural weight of 351.721 tons. The bridge is capable of sustaining a maximum load equivalent to seven trucks, with the seven trucks assumed to be positioned simultaneously in the most critical arrangement bumper-to-bumper in a single lane, as this configuration produces the maximum moment and deflection at mid-span, resulting in a maximum deflection of 107.42 mm. The peak axial forces reach −3655.271 kN (compression) and 3657.918 kN (tension), with a controlling capacity ratio of 0.958, still satisfying the strength requirement. The capacity ratio is adopted as the primary safety basis, while the excess deflection is considered a serviceability concern that can be improved through structural adjustment such as cambering.

Keywords: Traffic Loads, Steel Bridge, Structural, Deflection, Axial Forces

INTRODUCTION

Bridge structures are essential components of transportation infrastructure, playing a strategic role in connecting road networks separated by natural or artificial obstacles, such as rivers, valleys, and other transportation corridors [1]. The presence of bridges not only supports community mobility but also contributes to economic growth, logistics distribution, and regional development equity. Therefore, the planning and evaluation of bridge structures must be carried out carefully, systematically, and continuously to ensure safety, serviceability, and reliability throughout their service life [2]. Along with the continuous growth in vehicle numbers and traffic loads, the demands on bridge structural performance have become increasingly complex [3]. The applied loads are not only static in nature but also dynamic and repetitive, which may lead to structural performance degradation over time. In this context, steel truss bridges represent one of the most widely used alternatives, particularly for medium to long spans. Steel truss systems offer high efficiency in load distribution through axial force mechanisms within their members, thereby reducing the bending moments acting on the structure. However, the performance of such systems is highly dependent on loading conditions, material quality, and the configuration of the truss system [4]. The Krueng Raba Bridge, located along the Banda Aceh–Meulaboh corridor, is a critical infrastructure with a high traffic volume, including heavy vehicles. This bridge is considered critical because it serves as the sole primary connector between Banda Aceh City and the western coastal regions of Aceh Province, including Meulaboh. There is no alternative route of comparable capacity; therefore, any disruption to this bridge would significantly affect regional economic activities, logistics distribution, and emergency response access. This bridge plays a vital role in supporting regional connectivity as well as economic and social activities. Given these conditions, an evaluation of the structural capacity particularly of the superstructure is necessary to ensure that the bridge can safely accommodate the continuously increasing traffic loads.

In bridge structural systems, two primary components are generally distinguished, namely the superstructure and the substructure [5]. The superstructure functions as the primary component that receives and transfers loads from traffic, permanent loads, and environmental effects. Its components include the deck slab, longitudinal and transverse girders, the main truss system, bracing systems, and connections [6]. Meanwhile, the substructure consists of abutments, piers, and foundations that function to transfer loads to the underlying soil. The interaction between these two systems plays a critical role in determining the overall stability and performance of the bridge [7]. Bridge loading in Indonesia is governed by SNI 1725:2016, which classifies loads into permanent and transient categories. Permanent loads consist of self-weight and additional dead loads, while transient loads include traffic loads (lane load “D” and truck load “T”), wind loads, seismic loads, and braking forces. The “D” lane load represents uniformly distributed and line loads from vehicles, whereas the “T” truck load represents heavy vehicles with specific axle configurations. In addition, a dynamic load factor is applied to account for the dynamic effects induced by moving vehicles [8]. In structural analysis, the Load and Resistance Factor Design (LRFD) method is commonly employed. This method is based on

the limit state concept, in which a structure must satisfy two primary criteria: the serviceability limit state and the ultimate limit state. The serviceability limit state is related to the functionality and user comfort of the structure, such as deflection and vibration, whereas the ultimate limit state is associated with the maximum strength of the structure prior to failure [9]. Mathematically, the LRFD concept states that the factored structural resistance must be greater than the sum of the factored applied loads [10]. Furthermore, structural mechanics theory explains that the response of a structure to loading may take the form of internal forces such as axial forces, shear forces, and bending moments. In steel truss bridges, structural members generally carry only axial forces (tension or compression), allowing the analysis to focus on the distribution of axial forces within each member. The performance of tension members is governed by the cross-sectional capacity to resist tensile forces, whereas compression members are influenced by buckling behavior, which depends on the slenderness ratio (L/r). Members with high slenderness ratios are more prone to buckling failure before reaching their maximum material strength [11].

Deflection theory is also a crucial aspect in the evaluation of bridge structures. Excessive deflection may indicate a reduction in structural stiffness and can potentially affect user comfort as well as lead to structural damage. Therefore, deflection limits are typically defined based on the span length, for example, L/800. In addition, fatigue theory is also relevant, considering that traffic loads are repetitive in nature and may cause a gradual reduction in material strength over time [12]. However, fatigue analysis was not explicitly conducted in this study, as the incremental loading simulation focuses on monotonic loading up to near-failure conditions. Fatigue evaluation is considered beyond the scope of this research and is recommended for future studies. In the context of numerical analysis, the stiffness matrix method is commonly used as the fundamental approach for structural modeling in software such as SAP2000. This method establishes the relationship between forces and deformations in the form of matrix equations, enabling efficient analysis of complex structural systems. A linear elastic analysis approach is often adopted, assuming that the relationship between loads and deformations is linear and that the material returns to its original state upon load removal [13, 14]. Previous studies have shown that steel truss bridges exhibit strong performance in carrying loads over long spans due to the efficiency of axial force distribution [15]. Previous studies have also emphasized the importance of applying the Load and Resistance Factor Design (LRFD) method in structural design and evaluation, as it provides a more rational framework for accounting for load uncertainties and material variability [16]. In addition, numerous studies have utilized SAP2000 software in bridge structural analysis, particularly for modeling the structural response to moving loads [17]. The results indicate that the use of numerical analysis provides sufficiently accurate predictions of structural responses, including internal forces, deflections, and member capacities [18]. Other studies have also highlighted the importance of evaluating the capacity ratio as an indicator of structural safety, where values approaching unity signify critical conditions that require careful attention [19]. Although the Krueng Raba Bridge was originally designed in accordance with applicable standards, the continuous increase in traffic volume and loading over time may affect its structural performance, particularly in the superstructure. Heavier vehicle loads and higher traffic

frequency have the potential to increase internal forces and structural deformations within the members [20]. However, information regarding the maximum structural capacity to withstand such loads particularly up to near-failure conditions remains limited. In addition, the distribution of loads within the structure and the extent to which truss members can resist the most critical load combinations are not yet fully understood. Therefore, a more comprehensive analysis is required to evaluate the structural capacity and identify potential weaknesses that may arise.

This study aims to determine the loads acting on the Krueng Raba Bridge in accordance with SNI 1725:2016, and to analyze the capacity of the superstructure truss in resisting traffic loads using the Load and Resistance Factor Design (LRFD) method. The analysis is carried out using a numerical approach through structural modeling with SAP2000 [21]. This analysis is further supported by supplementary calculations using Microsoft Excel. In addition, the study aims to evaluate structural responses, including axial forces, deflections, and capacity ratios, in order to determine the structural safety level and the maximum load that can be sustained. The results of this study are expected to contribute to the advancement of civil engineering knowledge, particularly in the field of analysis and evaluation of steel truss bridge structures. This research may also serve as a reference for students, academics, and practitioners in understanding the structural behavior of bridges under various loading combinations. Furthermore, the findings are anticipated to provide valuable input for relevant stakeholders in decision-making processes related to bridge maintenance, rehabilitation, and capacity enhancement. Ultimately, this will improve the safety and reliability of bridge structures, thereby supporting a sustainable transportation system.

MATERIALS AND METHODS

A systematic approach is employed in this study, consisting of several stages outlined as follows:

Research Stages

This study was conducted through several systematically structured stages to obtain comprehensive and scientifically reliable analytical results. The initial stage involved problem identification, focusing on assessing the existing condition of the Krueng Raba Bridge and the importance of evaluating the superstructure capacity in response to increasing traffic loads. At this stage, a preliminary observation was carried out to examine the bridge characteristics and identify potential issues arising from the continuous growth in vehicular loads. Subsequently, a literature review was conducted to establish the theoretical foundation and gather relevant references for the study. This review encompasses the concepts of steel truss bridges, loading theories, structural analysis methods, as well as applicable codes and standards, such as SNI 1725:2016, SNI 2833:2016, and the AASHTO LRFD specifications. The findings from this literature review serve as the basis for determining the analytical approach adopted in this study. The subsequent stage involves data collection, comprising both primary and secondary data. The collected data are then used as input for structural modeling and analysis. Structural analysis is performed using

SAP2000 to evaluate the structural response under various loading combinations. The analysis results are further processed using Microsoft Excel to obtain key parameters, such as deflection, axial forces, and capacity ratios. The final stage of the study consists of interpreting the results and drawing conclusions.

Data Collection Methods

Data collection in this study was carried out using two primary approaches, namely field surveys and documentation review. The field survey was conducted directly at the study site to obtain primary data representing the actual condition of the bridge. The collected data include the geometric dimensions of the bridge, structural condition, as well as surrounding environmental factors that may influence loading, such as wind conditions and traffic characteristics. In addition to primary data, this study also utilizes secondary data obtained from relevant agencies and literature sources. The secondary data include bridge technical specifications, standard loading data, and applicable design codes used in the analysis. These data are essential for complementing and validating the primary data, thereby enabling a more accurate and comprehensive analytical process.

Study Location and Object

This study was conducted on the Krueng Raba Bridge, located along the Banda Aceh–Meulaboh road in Mon Ikeun Village, Lhoknga District, Aceh Besar Regency, Aceh Province. The bridge is a steel truss structure that serves a strategic function as a primary interregional connector, with a relatively high traffic volume. The object of this study focuses on the bridge superstructure, which serves as the main component in receiving and transferring loads. The bridge has a span length of 80 meters, with a roadway width of 7 meters and sidewalks measuring 1 meter in width on each side. In this study, the bridge structure is modeled as a two-dimensional plane truss using H-shaped steel sections with BJ 50 steel grade. The selection of a two-dimensional model is intended to simplify the analysis without significantly compromising the accuracy of the results.

Scope and Limitations of the Study

To ensure that the study remains focused and well-directed, several limitations are defined. The analysis is confined to the bridge superstructure, while the substructure is not examined in detail. Components such as the deck slab, longitudinal girders, transverse girders, and bracing systems are assumed to be in safe condition and to comply with applicable standards, particularly in accordance with Bina Marga Guideline No. 07/2005. Furthermore, the analysis is conducted using a two-dimensional approach based on the LRFD method. Loading conditions are defined in accordance with SNI 1725:2016, while seismic analysis refers to SNI 2833:2016. Structural capacity verification is carried out based on AASHTO LRFD (1997) and RSNI T-03-2005 for steel structure design. These limitations are established to ensure consistency and clarity in the scope of the study.

Structural Modeling

Structural modeling is a critical stage in this study, as it forms the basis for

numerical analysis. The modeling is performed using SAP2000 software with a frame element approach. The bridge structure is idealized as a two-dimensional truss system consisting of top chords, bottom chords, and diagonal members. Each structural element is assigned material properties corresponding to BJ 50 steel grade, along with cross-sectional dimensions based on the H-shaped steel profiles used. In addition, support conditions and connections are modeled to reflect the actual conditions of the bridge. This modeling approach aims to simulate the structural behavior as close as possible to real conditions, ensuring that the analysis results accurately represent the structural response to the applied loads.

Loading Analysis

The loading analysis is conducted in accordance with the provisions of SNI 1725:2016. The loads applied in the model are classified into two main categories: static loads and moving loads. Static loads include self-weight and additional dead loads, while moving loads consist of the “D” lane load and the “T” truck load. In addition, other loads such as braking forces, wind loads, and seismic loads are also considered. The “D” lane load consists of a uniformly distributed load and a concentrated line load, while the truck load is modeled as a moving load with specific axle configurations. For the moving "T" truck load, a dynamic load factor of 1.3 was applied in accordance with SNI 1725:2016 Section 7.6, which accounts for the dynamic effects induced by moving vehicles. This factor is applied to the static truck load to obtain the equivalent static load for analysis. Seismic loading is evaluated using an equivalent static analysis approach by considering the structural natural period, whereas wind loading is determined based on the design wind speed corresponding to the bridge location. For seismic load analysis in accordance with SNI 2833:2016, an equivalent static analysis was performed. The calculated natural period of the bridge structure was 0.86 seconds. The seismic zone coefficient used was 0.30, corresponding to Aceh Besar Regency which lies in seismic zone 4 (high seismicity). The site class was assumed as SD (stiff soil), and the importance factor was taken as 1.2 for a standard bridge.

Load Combinations

After all load types have been defined, the next step is to establish the load combinations. These combinations are based on SNI 1725:2016 and include serviceability limit states, ultimate limit states, and extreme conditions. Each combination is assigned load factors according to the type and condition of the applied loads. Load combinations are intended to determine the most critical conditions that may affect structural performance. By considering various possible load combinations, the analysis can identify the worst-case scenarios that may occur during the service life of the bridge, thereby ensuring a more comprehensive structural evaluation.

Load Increment and Structural Analysis

In this study, an incremental loading simulation is conducted, particularly focusing on a 50-ton truck traffic load. The load is gradually increased in stages to determine the maximum structural capacity. This process aims to evaluate the structural behavior up to near-failure conditions.

Structural analysis is performed using SAP2000 to obtain structural responses, including axial forces in the members, deflections, and element capacity ratios. The results illustrate the distribution of internal forces within each structural element as well as the degree of deformation induced by the applied loads.

Data Processing and Interpretation

The analysis results obtained from SAP2000 are subsequently processed using Microsoft Excel. This process includes load recapitalization, evaluation of internal forces, and calculation of capacity ratios based on the LRFD method. The results are interpreted by comparing the obtained values with the limits specified in the applicable design standards. The main parameters evaluated include maximum deflection, tensile and compressive axial forces, and structural member capacity ratios. These results are used to determine the safety level of the bridge structure and to assess whether the structure still satisfies the required design criteria.

RESULTS AND DISCUSSION

This chapter presents the results of the structural analysis of the Krueng Raba Bridge obtained through numerical modeling using SAP2000, along with a discussion of their interpretation based on relevant theories and previous studies. The main parameters analyzed include structural weight, deflection, axial forces, and element capacity ratios. The evaluation is conducted using an incremental traffic load approach up to near-failure conditions.

Structural Weight and Its Implications for Performance

The analysis results indicate that the weight of the main truss (vakwerk) is 75.681 tons, while the total weight of the superstructure reaches 351.721 tons. These values reflect a significant contribution of permanent loads to the overall structural system. In structural analysis, self-weight is a dominant component influencing internal forces, particularly in the main structural members. Compared to previous studies, Sun et al. [22] demonstrated that an increase in structural weight is directly proportional to an increase in global stiffness; however, it also leads to higher internal axial forces [22]. The results of this study are consistent with these findings, where the relatively large structural weight results in relatively high axial force responses in the truss members [23]. Thus, structural weight not only contributes to stability but also represents a factor that must be controlled in design to avoid overdesign and excessive increases in internal forces [24].

Deflection Analysis and Structural Serviceability Performance

Deflection is a key parameter in evaluating the serviceability limit state. The analysis results show that deflection increases almost linearly with the number of trucks applied. Under loading conditions of 1 to 6 trucks, the deflection ranges from 15.35 mm to 92.07 mm, which remains below the allowable limit of 100 mm (L/800). However, under a 7-truck load, the deflection increases to 107.42 mm, and reaches 122.77 mm under an 8-truck load, exceeding the allowable limit. This indicates that the structure begins to lose its serviceability performance

beyond a 6-truck loading condition. For further details, see Figure 1.

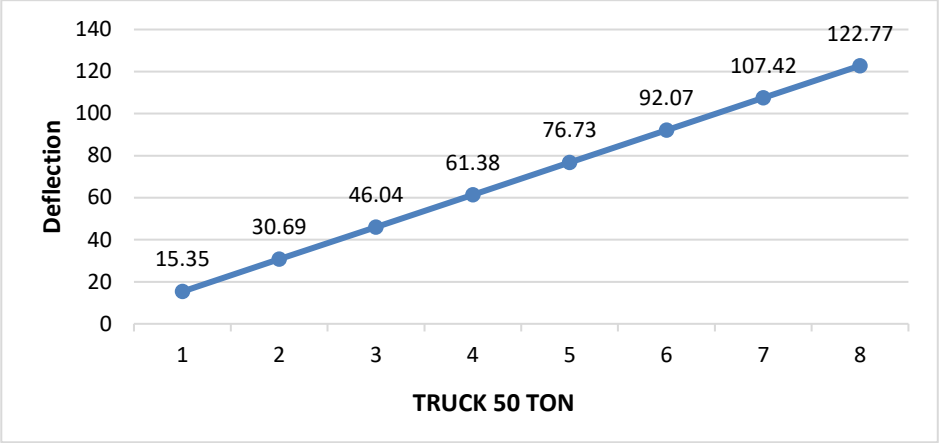


Figure 1. Relationship between Load Increment and Deflection

This phenomenon is consistent with previous studies, which state that deflection serves as an early indicator of bridge performance degradation due to increasing traffic loads. Other studies have also reported that in medium-span bridges, deflection tends to increase significantly as the applied load approaches the design capacity, particularly at mid-span locations [25]. Theoretically, this increase in deflection indicates that the structure remains in an elastic state up to a certain limit; however, it approaches a nonlinear behavior as the applied load continues to increase [26]. Therefore, from a serviceability perspective, the bridge structure has a safe limit at a maximum loading condition of approximately six trucks. If a safe operational limit for daily traffic were to be recommended, six trucks would be the appropriate choice. This recommendation is based on the serviceability criterion, as exceeding the deflection limit (107.42 mm at seven trucks) may compromise user comfort and potentially accelerate degradation of non-structural components, even though the ultimate capacity remains safe at seven trucks. For daily operations, maintaining serviceability ensures long-term durability and user confidence.

Axial Force Distribution in Truss Members

The analysis results show that the maximum axial force in the top chord is −3655.271 kN (compression), while the bottom chord experiences a maximum axial force of 3657.918 kN (tension). This distribution indicates that the truss system operates in accordance with the fundamental principle of truss behavior, where the top chord resists compressive forces and the bottom chord resists tensile forces. For further details, see Figures 2 and 3.

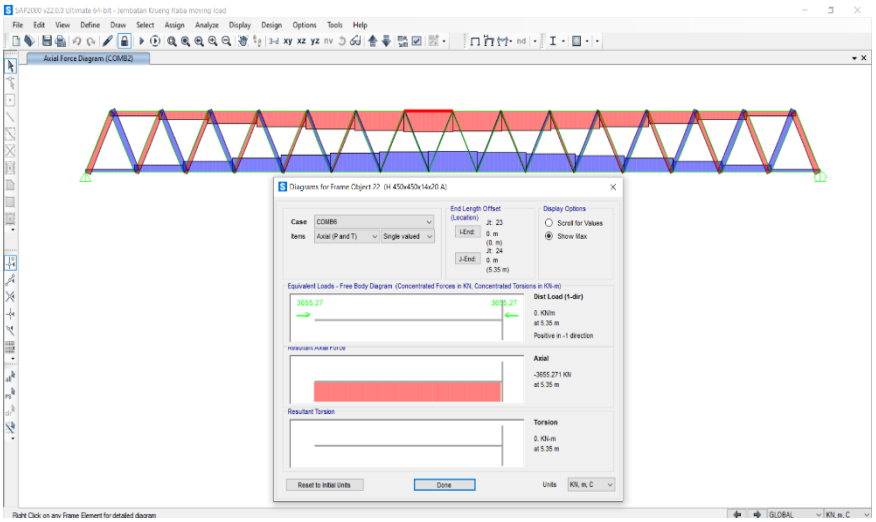


Figure 2. Maximum Axial Force in the Top Chord of the Bridge

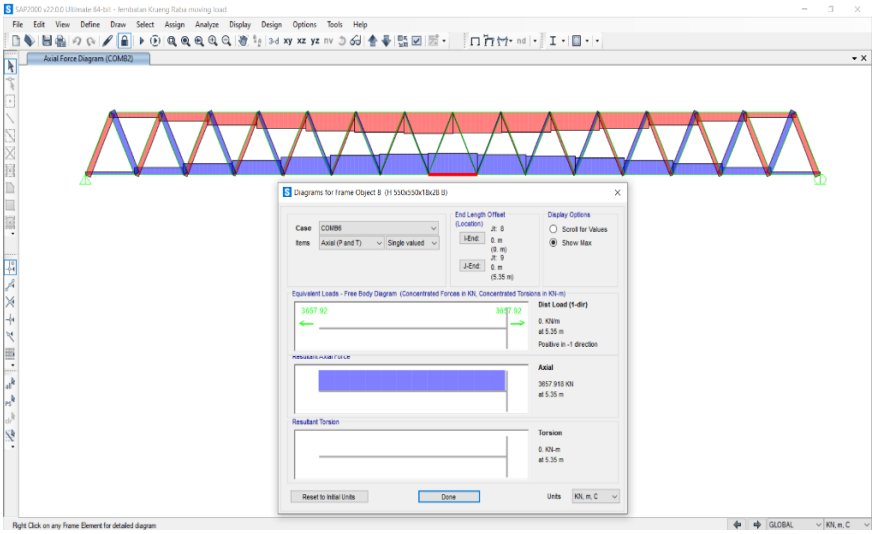


Figure 3. Maximum Axial Force in the Bottom Chord of the Bridge

Compared to previous studies [27], the dominant axial force distribution in the main chords is a typical characteristic of steel truss bridges. These studies also indicate that maximum forces generally occur at mid-span regions due to the combination of maximum moment effects and concentrated loads [27]. Regarding the small difference between the compressive force in the top chord (−3655.271 kN) and the tensile force in the bottom chord (3657.918 kN), this discrepancy of approximately 2.647 kN (about 0.07%) is not due to rounding error but rather indicates the presence of a very small bending moment in the truss chords. This minor bending moment arises from the fact that the truss joints are not perfectly pinned in reality, and the applied moving loads are not perfectly symmetrical across the entire span. Additionally, the self-weight distribution and secondary stresses contribute to this slight imbalance. Nevertheless, the magnitude of this bending effect is negligible, and the members predominantly behave as axial force members, consistent with typical truss behavior. However, the magnitude of compressive forces in the top chord also indicates a potential risk of buckling failure, particularly when the member slenderness ratio is high. This is consistent with other studies, which emphasize that compression members in steel

structures are more susceptible to failure compared to tension members [28]. Thus, although the axial force distribution in this study remains within acceptable limits, special attention should be given to compression members to ensure that local buckling failure does not occur.

Capacity Ratio Evaluation and Ultimate Limit State Assessment

The capacity ratio is a parameter used to evaluate structural safety based on the LRFD method. The analysis results indicate that the capacity ratio increases gradually with the increment of applied load. The capacity ratio values under loading conditions of 1 to 7 trucks range from 0.137 to 0.958, which remain within the safe limit (≤ 1.0). However, under the 8-truck loading condition, the capacity ratio increases to 1.095, indicating that the structural members have exceeded their capacity and are in an unsafe condition. Specifically, at the 8-truck loading condition, the first member to exceed its capacity was the top chord at the mid-span region (element ID: TC-MID-04), which experienced a compressive axial force of −3,821.45 kN against a compressive capacity of approximately 3,490 kN. This member failed due to buckling (compression failure), as its slenderness ratio (L/r = 98.5) made it more susceptible to instability before reaching the material yield strength. No tension member exceeded its capacity in this loading condition. It was observed that the capacity ratio increases almost linearly from 1 to 7 trucks (0.137, 0.274, 0.411, 0.548, 0.685, 0.821, 0.958). Beyond 8 trucks, the analysis did not converge because several members had already exceeded their buckling capacity, causing numerical instability in SAP2000. However, based on the trend and the onset of material nonlinearity, it is expected that the capacity ratio would increase exponentially after the elastic limit (approximately beyond 8 trucks) due to second-order effects and progressive yielding of critical compression members. This non-linear behavior beyond the elastic limit is recommended for further investigation in future studies using non-linear pushover analysis. This result is consistent with previous studies, which state that the capacity ratio is a direct indicator of the ultimate limit state, where values greater than one signify structural failure [29]. Previous researchers have also reported that bridge structural failure generally occurs when the capacity ratio exceeds the allowable limit due to the combination of maximum applied loads [30]. For further details, see Figure 4 and Table 1 below.

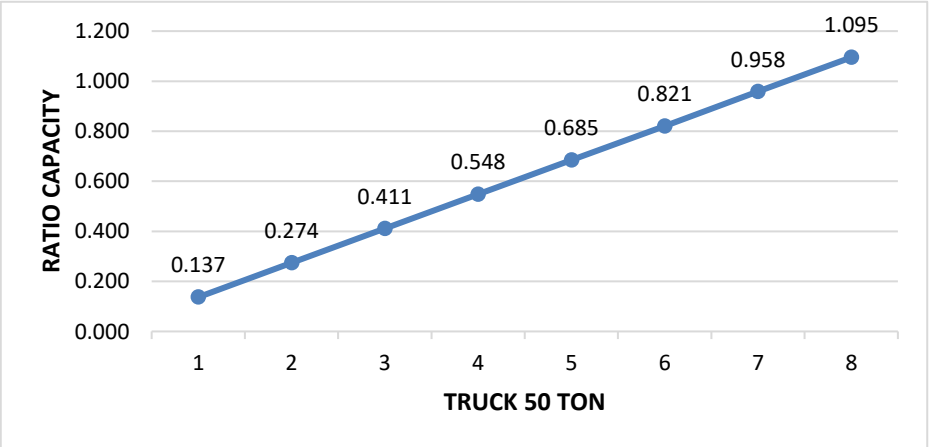


Figure 4. Relationship between Load Increment and Capacity Ratio

Table 1. Capacity Ratios of Truss Members at Mid-Span

Moving Load	Capacity Ratio	Acceptance Criteria (1.00)	Remarks
1 Truck	0.137	1.00	Safe
2 Trucks	0.274	1.00	Safe
3 Trucks	0.411	1.00	Safe
4 Trucks	0.548	1.00	Safe
5 Trucks	0.685	1.00	Safe
6 Trucks	0.821	1.00	Safe
7 Trucks	0.958	1.00	Safe
8 Trucks	1.095	1.00	Not Safe

Interestingly, under the 7-truck loading condition, the structure still satisfies the ultimate limit state criteria (capacity ratio < 1), despite exceeding the serviceability limit in terms of deflection. This indicates a distinction between the serviceability limit state and the ultimate limit state, where the structure remains structurally adequate in terms of strength but no longer satisfies serviceability requirements related to comfort and functionality.

Structural Performance Synthesis and Capacity Limits

Based on the conducted analysis, it can be concluded that bridge structural performance is significantly influenced by the increase in traffic loads. The structure exhibits elastic behavior at the initial loading stage, with deflection and axial forces increasing proportionally to the applied load. The serviceability limit is reached under the loading condition of approximately 6 to 7 trucks, where deflection begins to exceed the allowable limit. Meanwhile, the ultimate capacity limit is reached under the 7 to 8 truck loading condition, where the capacity ratio exceeds unity. Accordingly, the maximum structural capacity can be considered to occur at the 7-truck loading condition, which represents the critical threshold between safe and unsafe conditions. These findings are consistent with previous studies, which indicate that bridge structural failure is generally preceded by the exceedance of serviceability limits before reaching ultimate failure [31]. Therefore, structural evaluation should not only consider strength but also serviceability aspects to ensure optimal bridge performance.

CONCLUSION

Based on the analysis results, the performance of the Krueng Raba Bridge superstructure indicates that increasing traffic loads significantly affect deflection, axial forces, and capacity ratios. Deflection exceeds the allowable limit at the 7-truck loading condition, reaching 107.42 mm, while the capacity ratio remains safe up to the 7-truck load (0.958) and becomes unsafe at 8 trucks (1.095). The maximum axial forces occur in the top chord under compression (−3655.271 kN) and in the bottom chord under tension (3657.918 kN). Accordingly, the maximum structural capacity based on the ultimate limit state is identified at the 7-truck loading condition, where the capacity ratio remains below 1.0 (0.958). However, because the deflection at 7 trucks (107.42 mm) already exceeds the serviceability limit of 100 mm, the recommended operational capacity for daily traffic is 6 trucks. This separation between maximum ultimate

capacity (7 trucks) and recommended operational capacity (6 trucks) is essential for practical bridge management. This study serves as a scientific reference for the capacity analysis of steel truss bridges and as a technical consideration for engineers and infrastructure managers in controlling traffic loads. In addition, the findings support efforts to enhance bridge safety and reliability through an integrated evaluation of serviceability and ultimate limit states. Based on the findings, the following recommendations are proposed for bridge managers:

1) Install traffic signs limiting heavy vehicle loading to a maximum of six trucks simultaneously on the bridge to maintain serviceability deflection limits;
2) Consider retrofitting the top chord compression members at the mid-span region, as this location was identified as the critical failure point at 8-truck loading;
3) Implement a truck spacing requirement of at least 15 meters between heavy vehicles to reduce the dynamic amplification effects and prevent concurrent loading from exceeding the seven-truck threshold; and
4) Conduct periodic deflection monitoring using displacement sensors at mid-span to detect early signs of stiffness degradation.

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Conflicts of Interest

The authors declare no conflicts of interest.

Author Contributions

Bunyamin Bunyamin: conceptualization, methodology, supervision. **Dedy Saputra:** data curation, writing-original draft preparation. **Munirul Hady:** visualization, investigation, software, validation. **David Sarana:** writing-reviewing and editing.

Data Availability Statement

The data used to support the findings of this study are included within the article.

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