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Legal Study on the Oversight of Overloaded Motor Vehicles: Efforts to Protect Road Safety and Infrastructure

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Abstract

The oversight of motor vehicles exceeding weight limits is critical in safeguarding road safety and protecting infrastructure from premature damage. Overloaded vehicles are a common issue, contributing significantly to accidents and accelerated road deterioration, which incurs high repair costs and disrupts public transport and logistics. This study examines the legal frameworks and regulatory practices aimed at controlling vehicle overloading in Indonesia. Utilizing a normative juridical approach, the research reviews pertinent laws, regulations, and real-world cases involving load limit violations to gain insights into the effectiveness of existing policies. Findings reveal that while stringent load regulations are in place, enforcement remains inconsistent due to various limitations, including outdated monitoring technology, insufficient human resources, and challenges in coordinating between regulatory agencies. The research identifies critical obstacles in the current oversight mechanisms, such as a lack of real-time data collection and limited roadside weighing facilities, which hinder comprehensive monitoring. Furthermore, penalties for overloading are often inadequate to deter repeat violations. Based on these findings, this study recommends a multi-faceted approach to strengthen vehicle load regulation enforcement. Suggested improvements include upgrading monitoring technology, such as installing automatic weigh-in-motion systems, increasing the frequency and coverage of roadside inspections, and implementing more severe penalties to enhance deterrence. Additionally, the study emphasizes the need for inter-agency coordination and public awareness campaigns to foster compliance among vehicle operators. Through these initiatives, Indonesia can better protect its roadways, ensuring both road safety for all users and the long-term sustainability of its infrastructure.

Keywords: Motor Vehicle Oversight, Road Safety, Infrastructure Protection

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Introduction

Motor vehicles are one of the primary means of transportation in Indonesia, both for personal and commercial purposes. Along with the rapid development of the economy and the increasing number of vehicles, the problem of traffic congestion and accidents is increasingly complex. One of the issues that often occur on the highway is motor vehicles that exceed the load limit that regulations have determined. Vehicles that transport loads that exceed capacity endanger not only the safety of drivers and passengers but also other road users. Excessive loading can cause vehicle imbalances, worsen braking power, and increase the risk of accidents. In addition, more loaded vehicles can accelerate road damage, such as cracks and potholes that have the potential to endanger other motorists.[1]

To address this problem, Indonesia has issued various regulations regulating vehicle load limits, as stated in Government Regulation No. 55 of 2012 concerning Vehicles. However, despite the regulations, supervision of their implementation is often ineffective, so violations of cargo limits are still frequent. One of the main factors that causes the supervision of loaded vehicles to be more or less effective is the limited infrastructure to monitor vehicle loads on the highway. Many checkpoints are not equipped with modern facilities capable of detecting loads in real-time, such as Weigh-in-Motion (WIM) systems, so violations are often missed.[2]

[1] Budhi Setyawan dan Gea Meryna Sabrie, "KAJIAN POTENSI KENDARAAN BERMOTOR MENJADI BARANG KENA CUKAI," *JURNAL PERSPEKTIF BEA DAN CUKAI* 6, no. 2 (29 Desember 2022): 365–85, https://doi.org/10.31092/jpbc.v6i2.1778.

[2] Debby Maide Putra, "PENEGAKAN HUKUM TERHADAP KENDARAAN YANG MELEBIHI DAYA ANGKUT DAN DIMENSI SEBAGAI UPAYA PENANGGULANGAN KECELAKAAN LALULINTAS DAN KERUSAKAN JALAN," *Unes Journal of Swara Justisia* 6, no. 2 (4 Juli 2022): 112–19, https://doi.org/10.31933/ujsj.v6i2.250.

Overloaded vehicles are not only a risk to road safety but also worsen the condition of infrastructure. Roads that are often travelled by overloaded vehicles will quickly be damaged, leading to high repair costs. Road damage also interferes with the smooth flow of traffic and reduces the efficiency of goods transportation, which ultimately has a negative impact on the economy. Law enforcement against violations of vehicle load limits still faces various challenges. The lack of trained officers and limited supervision facilities cause law enforcement to run less than optimally. In addition, driver awareness of the dangers of overloaded vehicles still needs to be increased.[3]

The use of advanced technology such as Weigh-in-Motion (WIM) can be a solution to improve surveillance of overloaded vehicles. This technology allows automatic detection of vehicle loads without having to stop the vehicle. By utilizing this technology, surveillance can be carried out more efficiently and accurately at all main line points. In addition, the importance of coordination between agencies, such as the Police, the Transportation Office, and other related agencies, cannot be ignored. Collaboration between these institutions will ensure more comprehensive supervision, both in urban and remote areas, and facilitate more consistent law enforcement. Efforts to increase the capacity of human resources in terms of supervision also need to be made. Counselling drivers and the public about the dangers of overloaded vehicles and their impact on road safety and infrastructure damage should be part of a more holistic monitoring strategy. Increased training for supervisory officers is also needed so that they can carry out their duties more effectively.[4]

This study aims to evaluate legal policies related to the supervision of motor vehicles that exceed the load limit and provide recommendations for the improvement of a better supervision system. With more decisive and integrated measures, it is hoped that better protection of road safety and infrastructure sustainability can be achieved, as well as reduce the negative impact of overloaded vehicles.

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[3] Irvan Abu Arifaini dan Hari Soeskandi, "ANALISIS HUKUM KEBIJAKAN KELEBIHAN DIMENSI DAN KELEBIHAN MUATAN TERHADAP DEMONSTRAN GERAKAN SOPIR JAWA TIMUR," *Bureaucracy Journal : Indonesia Journal of Law and Social-Political Governance* 2, no. 3 (7 Desember 2022): 985–1002, https://doi.org/10.53363/bureau.v2i3.77.

[4] Muhammad Fatihul Hanif dan Ikhwanul Muslim, "Penegakan Hukum Terhadap Kendaraan Bermotor Angkutan Barang Over Dimension Over Load Di Kota Samarinda," *Borneo Studies and Research* 4, no. 1 (6 Desember 2022): 336–42.

Method

This research uses a normative juridical method[5], which aims to analyze the supervision of motor vehicles that exceed the load limit based on applicable laws and regulations. The approach used includes a legislative approach by reviewing Law Number 22 of 2009 concerning Road Traffic and Transportation, Government Regulation Number 55 of 2012 concerning Vehicles, and other related regulations. This approach aims to understand in depth how the rules regulate cargo limits, supervision mechanisms, and sanctions imposed for violations. In addition, this study adopts a conceptual approach to understanding the theory and concepts of law enforcement and road safety related to the supervision of motor vehicle load limits. The data used is secondary data collected through literature studies, including legal journals, scientific articles, and previous research reports. The analysis is carried out qualitatively by examining existing legal regulations and supervisory practices. This approach will evaluate the effectiveness of law enforcement and identify factors that affect violations in the field. The results of this study are expected to provide recommendations to improve the supervision and enforcement mechanism related to vehicle load limits in order to improve road safety and protect infrastructure.

Result and Discussion

Weaknesses of Regulation and Enforcement of Excess Load Supervision

Weaknesses in regulations and enforcement of excess load supervision are crucial issues that must be addressed immediately in an effort to maintain road safety and protect infrastructure. Although Indonesia has a number of regulations that regulate vehicle load limits, such as Law No. 22 of 2009 on Road Traffic and Transportation and Government Regulation No. 74 of 2014 on Road Transportation, its implementation is still hampered by various factors. One of the main factors is the lack of clarity and consistency in the implementation of these rules in the field, which has led to widespread violations of the fixed load limits. One of the main weaknesses identified is the incompatibility between existing regulations and practices in the field. Some regulations regulate vehicle load limits, but there is often ambiguity about practical measurement and supervision, especially for large vehicles or freight transport. Regulations that are too general or do not take into account certain road conditions make them less effective. In addition,

[5] Burhan Bungin, *Analisis Data Penelitian Kualitatif* (Jakarta: PT Raja Grafindo Persada, 2003).

surveillance of loaded vehicles is more often reactive, not preventive, so violations are only detected after damage or accidents have occurred.[6]

In addition, weaknesses in coordination between authorized agencies are also a significant problem. Vehicle load supervision involves various parties, including the Police, the Transportation Office, and other related parties. However, there is often overlapping authority and a lack of communication between these agencies, which hinders the effectiveness of supervision. Each agency tends to carry out its duties separately without good synergy, which leads to a lack of coordination in tackling overload violations. Another factor is the limitation of human resources and technology used in supervision. Many areas, especially remote ones, do not yet have adequate infrastructure to inspect vehicles effectively. Load monitoring is usually done manually using portable weighing tools that require more time and effort. The system is susceptible to measurement inaccuracies and can open up loopholes for abuse or violations, as there is an opportunity to evade inspection. Weak law enforcement also exacerbates the problem. Although there are rules that regulate sanctions for violators, they are often not applied consistently. Some drivers feel that the fines or sanctions imposed are not hefty enough to be a deterrent for them to comply with the load limit. This further exacerbates the situation, as the violating driver does not feel threatened by the legal risks that exist.[7]

The lack of awareness from drivers and transportation entrepreneurs is also a factor that exacerbates this problem. Some drivers or companies are more concerned with economic benefits, such as the delivery of goods in bulk than road safety and the quality of the infrastructure. They may not understand the long-term impact of overloading on road damage and potential accidents, or they may deliberately ignore regulations for the sake of cost efficiency. In order for the supervision of loaded vehicles to be more effective, there needs to be a more detailed and realistic update and adjustment of regulations. One of them is to harmonize existing regulations with conditions and needs in the field, as well as develop a more integrated and technology-based supervision system. In addition, strengthening coordination between agencies and increasing the

[6] Leo Sentosa dan Asri Awal Roza, "Analisis Dampak Beban Overloading Kendaraan Pada Struktur Rigid Pavement Terhadap Umur Rencana Perkerasan (Studi Kasus Ruas Jalan Simp Lago – Sorek Km 77 S/D 78)," *Jurnal Teknik Sipil* 19, no. 2 (1 Agustus 2012): 161–68, https://doi.org/10.5614/jts.2012.19.2.7.

[7] Lolo Jumpa Ate Manik dan Parlindungan Siregar, "Pengaruh Muatan Berlebih (Overloading) Terhadap Umur Rencana Jalan," *Jurnal Dunia Pendidikan* 4, no. 3 (31 Maret 2024): 1340–51, https://doi.org/10.55081/jurdip.v4i3.2158.

training of officials are also essential steps in ensuring that law enforcement runs more effectively and consistently throughout Indonesia.[8]

Multidimensional Impact of Overload on Safety and Infrastructure

The multidimensional impact of overloading motor vehicles on road safety and infrastructure is significant, both in social, economic, and technical aspects. One of the most direct impacts is the increased risk of traffic accidents. Vehicles that carry loads that exceed the permitted capacity tend to have reduced stability, both in terms of brakes, directional control, and weight distribution. When overloaded vehicles face sub-ideal road conditions or suddenly brake hard, the risk of accidents such as rolling over or skidding becomes higher, which in turn endangers drivers, passengers, and other road users. In addition, overloading contributes to a decrease in vehicle performance, such as failure in the suspension system and faster tyre wear. This condition increases the potential for mechanical damage to the vehicle, which not only endangers driver safety but can also lead to broader traffic disruption. Some studies show that accidents involving loaded vehicles more often cause more significant material losses and more fatalities, especially if the vehicles carry dangerous goods.[9]

The impact of overloading is also not limited to safety but includes worsening damage to road infrastructure. Roads that are often travelled by loaded vehicles experience faster wear. Loads heavier than the recommended load limit cause excessive pressure on the road surface layer, which accelerates the process of asphalt damage, cracks, or even potholes. According to research, road damage caused by overloading leads to high repair costs, which are often unexpected and weigh on state budgets. Damage to infrastructure also has an impact on economic productivity. Damaged roads will slow down the flow of transportation, reduce the efficiency of goods distribution, and increase operational costs for transportation companies and entrepreneurs. Road damage that requires periodic maintenance or repairs can also disrupt local and national economic activities. The

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[8] Lambang Antono, "IMPLEMENTASI KEBIJAKAN ODOL DALAM UPAYA MENINGKATKAN SISTEM PENGAWASAN DAN PENGENDALIAN MUATAN ANGKUTAN BARANG," *Humantech : Jurnal Ilmiah Multidisiplin Indonesia* 1, no. 11 (25 September 2022): 1720–29, https://doi.org/10.32670/ht.v1i11.2315.

[9] Nim Dofa Roki, "PENGAWASAN ANGKUTAN BARANG DENGAN KENDARAAN BERMOTOR RODA ENAM YANG MELEBIHI KAPASITAS MUATAN DAN KELEBIHAN DIMENSI OLEH DINAS PERHUBUNGAN KABUPATEN SANGGAU," *Jurnal Fatwa Hukum* 6, no. 4 (5 September 2023), https://jurnal.untan.ac.id/index.php/jfh/article/view/69872.

deterioration of road quality has the potential to cause delays in the delivery of goods and hinder the mobility of goods and people, ultimately reducing economic competitiveness.[10]

From the economic side, infrastructure damage caused by loaded vehicles creates an additional burden on the government budget for road maintenance and repair. Budgets that should have been allocated to the development of new infrastructure often have to be diverted to repair damage caused by overloading. In addition, the cost of repairing damaged roads is also higher because roads damaged by overloading require more frequent maintenance and are at a more significant cost. The long-term impact of overloading on road infrastructure is increasingly worrying. If supervision of cargo limits is not tightened, continued damage will threaten the sustainability of Indonesia's transportation infrastructure. Major roads, especially those connecting economic and distribution centres, will become increasingly damaged and cannot be used optimally, which in turn hampers regional and national economic growth. Therefore, strict supervision of vehicle load limits is crucial not only for safety but also for maintaining the quality and sustainability of road infrastructure, which is vital for the country's economy.[11]

Comparison of Cargo Control Policies with Other Countries

A comparison of motor vehicle load control policies between Indonesia and other countries shows significant differences in terms of regulatory implementation, supervision effectiveness, and the resulting impact. Some countries, such as Singapore and Germany, have adopted more sophisticated systems for the surveillance of overloaded vehicles, while Indonesia still faces significant challenges in terms of consistent law enforcement and integrated surveillance. Singapore, for example, has a rigorous surveillance system through the use of advanced technology, including automatic scales (Weigh-in-Motion), which allows the inspection of heavy vehicles without stopping the flow of traffic. This system has proven to be effective in reducing load limit violations, as violating vehicles will be immediately detected and sanctioned without disrupting the smooth flow of traffic. In addition, Singapore also imposes sizable

[10] Nur Halimatus Sa'diyah, Siti Shofiah, dan Riza Phahlevi Marwanto, "Analisis Vehicle Damage Factor Dalam Konteks Konfigurasi Axle Dan Dampak Jalan," *Jurnal TESLINK : Teknik Sipil Dan Lingkungan* 6, no. 1 (31 Maret 2024): 109–17, https://doi.org/10.52005/teslink.v6i1.333.

[11] Angelalia Roza, Ahmad Refi, dan Dona Desrisa Murni, "Dampak Kelebihan Muatan Terhadap Umur Rencana Perkerasan Jalan," *Jurnal Ilmiah Rekayasa Sipil* 17, no. 2 (31 Oktober 2020): 121–33, https://doi.org/10.30630/jirs.12.2.397.

fines and administrative sanctions for drivers who violate the load limit, which has a significant deterrent effect.[12]

In Germany, the payload surveillance system also uses similar technology, with the addition of satellite-based surveillance to monitor heavy vehicles on the road. The country not only relies on scales but also uses a surveillance camera system that is integrated with the vehicle database, so it can quickly detect violations without the direct involvement of officers. Sanctions in Germany are also quite severe, with high fines and prohibitions for allowing transport companies to operate in certain regions, aiming to maintain road safety and infrastructure quality. In contrast to Singapore and Germany, Indonesia still faces various challenges in implementing effective cargo control. Despite regulations such as Law No. 22 of 2009 concerning Road Traffic and Transportation and Government Regulation No. 74 of 2014, implementation in the field is still not optimal. Supervision of overloaded vehicles in Indonesia tends to be carried out manually with portable scales that require more time and effort. The system is prone to measurement inaccuracies and loopholes for abuse, resulting in a high rate of constant load limit violations.[13]

In addition, the lack of coordination between authorized agencies such as the Police, the Transportation Agency, and the Transportation Supervisory Agency makes supervision less effective. Each agency carries out its duties without good synergy, which hinders the supervision of overloaded vehicles on the highway. Weak law enforcement and insufficiently significant sanctions are also some of the factors why drivers of overloaded vehicles are still widely found on the road. Although Indonesia has adopted surveillance technologies such as automatic scales at some points, its application is still limited to certain roads and is not evenly distributed across the region. In addition, the high cost of technology implementation and limited infrastructure in some regions are significant obstacles to the effective monitoring of overloaded vehicles. Therefore, there

[12] Winsherly Tan dan Maharani Millenia Hussy, "PERBANDINGAN KEBIJAKAN PENGAWASAN PERBANKAN DI INDONESIA DAN SINGAPURA," *Jurnal Justitia : Jurnal Ilmu Hukum Dan Humaniora* 9, no. 1 (28 Januari 2022): 14–27, https://doi.org/10.31604/justitia.v9i1.14-27.

[13] Alexander Syauta, "Perbandingan Sistem Hukum Benua Eropa Dan Sistem Hukum Nasional Indonesia," *Jurnal Penegakan Hukum Indonesia* 3, no. 1 (11 Februari 2022): 1–13, https://doi.org/10.51749/jphi.v3i1.53.

is an urgent need to improve coordination between agencies, strengthen law enforcement, and develop a technology-based surveillance system throughout Indonesia.[14]

The following is a comparison table of vehicle load control policies between Indonesia, Singapore, and Germany:

Aspects	Indonesia	Singapore	Germany
Regulation	Law No. 22 of 2009, Government Regulation No. 74 of 2014	Road Traffic Act, Vehicle Load Limits Regulation	Road Traffic Act, Weighing and Load Regulations
Surveillance System	Manual scales, limited automatic scales	Automatic scales (Weigh-in-Motion), state-of-the-art technology-based surveillance	Automatic scales, satellite-based surveillance and integrated cameras
Law Enforcement	Supervision is not consistent; law enforcement is weak	Law enforcement is rigorous, with high fines and administrative sanctions	Law enforcement is rigorous, high fines and prohibitions of operations for violators
Surveillance Technology	Limited, mostly manual	Use of automated scales and digital sensors for load monitoring	Use of advanced technology, including cameras and satellites
Inter-Agency Coordination	Lack of coordination between agencies involved in supervision	Excellent coordination between various government agencies	Highly integrated inter-agency coordination
Penalty	Fines are often not hefty enough; enforcement is inconsistent	Significant fines, effective administrative sanctions	High fines, prohibition of operations for violators
Scope of Supervision	Limited to a few points, not evenly distributed throughout the region	Surveillance is evenly distributed throughout the region with advanced technology	Equitable surveillance, including remote areas with satellite systems

From this comparison, it can be concluded that the cargo control policy in Indonesia still needs much improvement, both in terms of regulations, technology, and law enforcement. The adoption of advanced technology and improved inter-agency

[14] Zainal Abdul Aziz Hadju, "Analisis UNCLOS 1982 Terkait Permasalahan Yurisdiksi Negara dan Penegakan Hukum Atas Kapal Berbendera Negara Asing," *SASI* 27, no. 1 (25 Maret 2021): 12–23, https://doi.org/10.47268/sasi.v27i1.254.

coordination, such as those implemented in Singapore and Germany, will significantly assist Indonesia in improving vehicle load surveillance and protecting road safety and infrastructure more effectively.[15]

Economic Impact of Overloading on Infrastructure

The economic impact of overloading on road infrastructure is a serious problem that can harm the country in the long run. One of the main impacts is the increase in the cost of maintenance and repair of damaged roads due to pressure from vehicles carrying loads exceeding capacity. Roads that are often travelled by overloaded vehicles will experience faster wear and tear, thereby shortening the life of the infrastructure. This requires the government to allocate a larger budget for road maintenance and repair, which should be used for the development of new infrastructure. The economic impact can also be seen from the increase in transportation operational costs. Road damage caused by overloading leads to increased costs for transport entrepreneurs. Damaged or potholed roads will slow down traffic flow and increase the cost of repairing vehicles that are more often damaged by bad roads. Drivers also tend to spend more time on the road due to congestion or detours, which leads to a decrease in efficiency and productivity in the distribution of goods. Higher transportation costs will be passed on to consumers in the form of more expensive goods prices, thus adding to the economic burden.[16]

In addition, infrastructure damage due to overloading also has an impact on economic competitiveness. Poor road infrastructure will hinder the smooth distribution of goods and human mobility, which in turn affects economic activities. Transportation speed and efficiency are essential factors in global market competition. Countries or regions with poor road infrastructure will find it more challenging to compete in international trade, as shipping costs and reliance on longer and inefficient transportation routes will be higher. The long-term economic impact is also related to the social costs incurred as a result of traffic accidents. Overloaded vehicles that cause accidents can add to the country's economic burden, both in terms of victims' medical costs, material losses,

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[15] T. Reza Zulkarnaen, "IMPLEMENTASI KEBIJAKAN PENGAWASAN DAN PENGENDALIAN MUATAN LEBIH," *Jurnal Administrasi Publik (Public Administration Journal)* 1, no. 2 (12 September 2011): 209–31, https://doi.org/10.31289/jap.v1i2.941.

[16] Tumiran Anang Cundoko dkk., "Pengaruh Over Loading Mobil Barang Terhadap Sistem Pengereman Di Wilayah Jalan Nasional Di Provinsi Bali (Studi Kasus Kecelakaan Lalu Lintas Kekhususan Mobil Barang)," *Jurnal Teknologi Transportasi Dan Logistik* 3, no. 1 (1 Mei 2022): 39–50, https://doi.org/10.52920/jttl.v3i1.50.

and the cost of rehabilitating damaged infrastructure. Any accident involving more loaded vehicles can affect local economic activities and disrupt the smooth distribution of goods. Further, a higher number of accidents will increase the burden of insurance and safety costs that the government or transportation companies must incur.[17]

The weak surveillance system of overloaded vehicles also contributes to low state revenues from the transportation sector. Without strict supervision, violations of load limits continue to occur and cause even more significant damage to infrastructure. This reduces the potential state revenue from the tax and levy sector that can be used to fund the construction and maintenance of other infrastructure. Thus, better supervision will improve compliance and can bring in more revenue for the transportation sector, which can be used for road repairs. The economic impact of overloading also touches the tourism sector. Poor infrastructure due to road damage can affect travel comfort, especially in areas that are tourist destinations. Damaged or challenging-to-pass roads can reduce the attractiveness of an area for tourists, both domestic and international. This can have a negative effect on the tourism industry, which is one of the sectors that can make a significant contribution to the regional and national economy.[18]

Another economic impact is the reduction in the quality of life of the community. When road infrastructure is damaged, people will be forced to face inconveniences in transportation, such as congestion, longer journeys, and vehicle damage. This can lead to a decrease in individual productivity, especially for those who rely on transportation for work or business. Additionally, increased congestion can increase air pollution, which in turn can impact public health and lead to higher health costs. Based on these impacts, there needs to be a firmer policy and better supervision of overloaded vehicles to protect the country's infrastructure and economy. Stricter law enforcement, adoption of technology for surveillance, and increased awareness among transport entrepreneurs and the general public will help prevent more significant negative impacts in the future.[19]

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[17] Zulkarnaen, "IMPLEMENTASI KEBIJAKAN PENGAWASAN DAN PENGENDALIAN MUATAN LEBIH."

[18] Fitri Kartiasih, "DAMPAK INFRASTRUKTUR TRANSPORTASI TERHADAP PERTUMBUHAN EKONOMI DI INDONESIA MENGGUNAKAN REGRESI DATA PANEL," *Jurnal Ilmiah Ekonomi Dan Bisnis* 16, no. 1 (31 Maret 2019): 67–77, https://doi.org/10.31849/jieb.v16i1.2306.

[19] Paulus Iriyena, Amran T. Naukoko, dan Hanly F. DJ Siwu, "ANALISIS PENGARUH INFRASTRUKTUR JALAN TERHADAP PERTUMBUHAN EKONOMI DI KABUPATEN KAIMANA 2007-2017," *Jurnal Berkala Ilmiah Efisiensi* 19, no. 02 (2 Juli 2019), https://ejournal.unsrat.ac.id/v3/index.php/jbie/article/view/24861.

Implementation-Oriented Policy Recommendations

Implementation-oriented policy recommendations related to the supervision of motor vehicles that exceed the load limit must consider several important aspects, ranging from technical and legal to social aspects. One of the first steps that needs to be taken is to strengthen existing regulations by clarifying vehicle load limits based on road type and capacity. Law No. 22 of 2009 on Road Traffic and Transportation and Government Regulation No. 74 of 2014 can be updated to accommodate new technologies that can improve the effectiveness of surveillance, such as sensor-based surveillance systems and remote sensing technology. More explicit regulations will facilitate law enforcement and increase public compliance. Furthermore, the implementation of advanced technology in the supervision of loaded vehicles needs to be strengthened. The use of automatic scales (Weigh-in-Motion) and satellite-based technology to monitor vehicles along significant roads can increase the effectiveness of surveillance without disrupting the smooth flow of traffic. This technology allows vehicles that exceed the load limit to be detected directly and automatically sanctioned and reduces manual involvement in the surveillance process. The use of this technology can also minimize the potential for abuse of authority or legal loopholes that often occur in manual supervision.[20]

Increasing the capacity of human resources to supervise is also an essential step in the implementation of this policy. Well-trained officers will be better able to identify violations that occur and take action in accordance with existing regulations. Training programs for transportation surveillance officers, both from the Police, the Transportation Agency, and other supervisory agencies, must be held regularly to ensure high standards of supervision. In addition, strengthening coordination between various agencies involved in the supervision of loaded vehicles is more important so that there are no gaps in policy implementation. On the other hand, implementation-oriented policies also require increased supervision of the logistics and freight transportation sectors. Transportation entrepreneurs need to be educated about the importance of complying with vehicle load limits to maintain mutual safety and protect road infrastructure. The government can provide incentives for transportation companies that have fleets that

[20] Muhammad Alwan Yassin, Dida Rahmadanik, dan M. Kendry Widiyanto, "IMPLEMENTASI KEBIJAKAN OVER DIMENSION AND OVER LOADING (ODOL) ANGKUTAN BARANG INDUSTRI DI DINAS PERHUBUNGAN KABUPATEN SIDOARJO," *PRAJA Observer: Jurnal Penelitian Administrasi Publik (e- ISSN: 2797-0469)* 3, no. 04 (1 Juli 2023): 32–38.

comply with applicable cargo regulations, for example, by providing tax breaks or rewards for regulatory compliance.[21]

To support more effective supervision, adequate infrastructure improvements are also needed, especially for locations prone to violations. Local governments must collaborate with central agencies to build inspection points for overloaded vehicles equipped with automatic weighing facilities and other detection tools. Adequate inspection infrastructure will speed up the surveillance process and reduce the likelihood of overloaded vehicles escaping inspections. In addition, the role of the community is also significant in the successful implementation of this policy. The government needs to conduct an awareness campaign to the public about the dangers and impacts of overloaded vehicles, both in terms of traffic safety and infrastructure damage. The campaign can be conducted through various communication channels, including social media, seminars, and workshops involving transportation entrepreneurs, drivers, and the general public. A better understanding of the dangers of overloading can improve compliance with existing regulations.[22]

One of the other recommendations is to tighten sanctions and fines for violations of cargo limits. The sanctions given must be able to provide a deterrent effect to violators. The government may consider implementing more significant fines and other administrative sanctions, such as restrictions on operational permits for companies that repeatedly violate the provisions. By providing firm and clear sanctions, it is hoped that it can create a sense of responsibility among entrepreneurs and freight transport drivers. Finally, evaluation and monitoring of policy implementation must be carried out regularly. Policies that have been implemented need to be evaluated periodically to assess their effectiveness in reducing load limit violations and infrastructure damage. The government needs to provide a mechanism to obtain feedback from the public, entrepreneurs, and other relevant parties to find out whether the policies implemented are effective or need to be adjusted to field conditions. With these measures, the policy of monitoring motor vehicles that exceed the load limit can be effectively implemented,

[21] Lisa Olivia Saputri dan Hasim As'ari, "IMPLEMENTASI KEBIJAKAN PENERTIBAN LALU LINTAS TRUK BERTONASE BESAR DI KOTA PEKANBARU," *Jurnal Media Administrasi* 7, no. 2 (2022): 34–41, https://doi.org/10.56444/jma.v7i2.459.

[22] Arifaini dan Soeskandi, "ANALISIS HUKUM KEBIJAKAN KELEBIHAN DIMENSI DAN KELEBIHAN MUATAN TERHADAP DEMONSTRAN GERAKAN SOPIR JAWA TIMUR."

maintaining road safety and protecting infrastructure from damage caused by load limit violations.

Conclusion

The conclusion of this study shows that the weakness of regulations and law enforcement related to the supervision of overloaded vehicles is still a severe problem in Indonesia. Existing regulations have not been implemented consistently and are constrained by a lack of coordination between agencies and limited resources, which leads to driver compliance with low load limits. This situation exacerbates safety risks on highways and accelerates infrastructure damage, ultimately putting a strain on government budgets for continuous road repair and maintenance. The use of surveillance technologies such as automated scales and digital sensors has excellent potential to strengthen effective load surveillance. Comparative studies with countries such as Singapore and Germany show that the application of advanced technology in cargo surveillance has improved compliance and reduced the number of violations. However, challenges in the implementation of technology in Indonesia, such as uneven costs and infrastructure, require a planned implementation strategy, including support from national policies and training of officials involved in law enforcement.

This study recommends implementation-based policies that include the addition of surveillance points in the central lane, increased penalties for cargo violations, and the integration of technology in surveillance. This comprehensive approach is expected to create more effective supervision, protect public safety, and sustainably maintain infrastructure quality. With better policy implementation, Indonesia can reduce the negative impact of overloaded vehicles and support more efficient and sustainable infrastructure development.

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