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Over Dimension Over Loading in Indonesia: A Systemic Analysis of Policy Impasses and Pathways to a Sustainable Multimodal Future

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Abstract: The phenomenon of Over Dimension Over Loading (ODOL) in Indonesia has evolved into a systemic issue impacting transportation infrastructure, logistics, and public safety. ODOL practices, involving the operation of vehicles with loads or dimensions exceeding legally defined limits, have become widely accepted despite the presence of clear legal frameworks. This research aims to analyze the root causes of the ODOL problem and develop an integrated multimodal policy model to reduce ODOL violations in Indonesia. Using Soft Systems Methodology (SSM), the research proposes a policy approach that includes enhancing governance, implementing surveillance technologies such as Weigh-in-Motion (WIM), calibrating progressive penalties, and shifting modal transport to rail and sea. These recommendations are designed to address non-compliance with regulations and create a more efficient and sustainable transportation system.

Keyword: ODOL, Transportation Policy, Soft Systems Methodology, Weigh-In-Motion, Progressive Sanctions

INTRODUCTION

The phenomenon of Over Dimension Over Loading (ODOL) in Indonesia has evolved from a traffic violation into a systemic pathology rooted in the national transportation, logistics, and supply chain landscape. For more than a decade, this practice has become widely accepted, driven by complex economic calculations and perpetuated by policy deadlocks between government institutions. To fully understand why this problem persists, an analysis beyond law enforcement on the streets is needed to delve into the root issues from the regulatory side, the socio-economic impacts, and the existing governance structure. This section will dissect the anatomy of ODOL, from its technical and legal definitions to the quantification of its destructive impacts on the economy and public safety.

Fundamentally, ODOL refers to the practice of operating freight vehicles whose dimensions (length, width, height) and/or loads exceed legally established limits. These limits are not arbitrary numbers but technical parameters designed to balance logistics efficiency with infrastructure capacity and safety standards. The main legal framework governing vehicle dimensions and loads in Indonesia is Law Number 22 of 2009 on Road Traffic and Transportation (UU LLAJ) and its implementing regulations. UU LLAJ explicitly mandates that roads be classified into several classes based on their function and load-bearing capacity to accommodate the Maximum Axle Load (MST) and vehicle dimensions.[1]

Table 1: National Regulatory Standards for Vehicle Axle Dimensions and Loads (Based on Law 22/2009 & Government Regulation 55/2012)

Road Class	Maximum Width (mm)	Maximum Length (mm)	Maximum Height (mm)	Maximum Axle Load (MST) (Ton)
Class I	2,500	18,000	4,200	10
Class II	2,500	12,000	4,200	8
Class III	2,100	9,000	3,500	8
Special Class	> 2,500	> 18,000	4,200	> 10

Source: Processed from Article 19 of Law No. 22 of 2009 and Government Regulation No. 55 of 2012[2]

Government Regulation Number 55 of 2012 concerning Vehicles provides more detailed technical specifications regarding vehicle dimensions, cargo beds, and the Maximum Allowed Weight (JBI) or Permitted Maximum Weight (JBB) for various axle configurations[4]. This regulation comprehensively establishes technical limits that must be adhered to by vehicle manufacturers, body companies, and freight transport operators. Violations of these provisions are subject to clear sanctions. Article 277 of the Traffic and Road Transport Law (UU LLAJ) stipulates a prison sentence of up to 1 year or a fine of up to IDR 24 million for anyone who modifies a vehicle (over-dimension) so that it no longer meets technical and roadworthy requirements[7]. Meanwhile, Article 307 of the Traffic and Road Transport Law regulates a prison sentence of up to 2 months or a fine of up to IDR 500,000 for drivers who violate loading procedures (overloading)[8]. Although the legal framework has been in place for more than a decade, the reality on the ground shows massive and systematic non-compliance. ODOL (Over Dimension Over Loading) is no longer an incidental violation but has become a standard business model in the freight transportation industry[9]. It is estimated that more than 90% of freight transport operators serving various heavy industries routinely operate ODOL fleets[10].

This practice is especially common for transporting low-value commodities per unit weight, where volume becomes the key to achieving profit margins. Data from the Vehicle Weighing Unit (UPPKB) at various locations confirm this. At UPPKB Samboja, 53% of ODOL trucks are transporting basic necessities, and 30% are transporting construction materials[11]. At UPPKB Cikande, 57% of ODOL trucks are transporting construction materials. Academic studies in Indonesia have even shown more extreme figures, where 30-40% of trucks in Sumatra carry loads more than 100% above the legal limit, with some cases approaching 150%. This phenomenon is consistent with global research findings that identify overloading as a chronic issue in many developing countries, driven by economic pressures and weak law enforcement[12].

The pervasiveness of ODOL indicates a deeper problem than mere failure in law enforcement. It is a symptom of a fundamental misalignment between the existing regulatory framework and the economic realities of the national logistics system. The regulations that have been in effect for over a decade are clearly not being followed by the majority of

operators[10]. This implies that for most operators, compliance with the rules is considered economically unfeasible. In this context, overloading becomes a rational business decision—although illegal—in order to survive in a high-cost logistics ecosystem[16]. Therefore, the ODOL problem is not merely a criminal issue, but a reflection of systemic economic pressures. Any solution that focuses solely on stricter law enforcement without addressing the underlying economic drivers is, in essence, only treating the symptoms, not the disease.

The negative impacts of rampant ODOL practices are not abstract. They can be measured in terms of financial losses amounting to trillions of rupiah, loss of human lives, and inefficiencies that undermine the national economy's competitiveness. The most frequently cited and easily measurable impact is the financial loss to the state due to premature damage to road and bridge infrastructure. The Ministry of Public Works and Public Housing (KemenPUPR) has consistently reported that the country's losses for road maintenance due to ODOL reach a staggering IDR 43.45 trillion to IDR 43.47 trillion annually[11]. This figure is not just a budget burden, but also a massive opportunity cost, where those funds could be allocated for new infrastructure development.

International and national academic research validates these figures. Overload axles have an exponential impact on road surface damage, in accordance with the "Fourth Power Law." A study shows that increasing axle load from 10 tons to 13 tons triples the road damage factor and reduces the road's planned lifespan from 10-11 years to only 3 years[20]. Other research finds that a 15% increase in vehicle total weight can cause fatal damage to bridges up to twice as much[14]. Furthermore, maintenance costs for overloaded vehicles can be 100% higher than for vehicles that comply with regulations. Reducing the number of ODOL vehicles from 23% to just 5% has been shown to extend the road surface's lifespan by 1.5 times and reduce maintenance costs by 11%[23].

Beyond the financial losses, there is a human tragedy. ODOL vehicles are a major contributor to fatal traffic accidents in Indonesia[15]. Data from the National Traffic Corps (Korlantas Polri) recorded that in 2024, freight vehicles were involved in 27,337 accidents. Data from Jasa Raharja in the same year placed ODOL vehicles as the second-largest cause of road transport accidents, resulting in 6,390 fatalities. In 2019, the National Transportation Safety Committee (KNKT) recorded a total of 25,652 fatalities from traffic accidents, meaning an average of 71 lives lost per day or 3-4 lives per hour, with ODOL being a significant factor[18].

The technical causes are clear. Overloading drastically disrupts vehicle performance, such as reducing the effectiveness of the braking system (brake failure), increasing stopping distances, raising the risk of tire blowouts due to excessive pressure and heat, and decreasing vehicle stability, especially when maneuvering or on uneven roads[19]. Over-dimensions also create larger blind spots and make it difficult for other vehicles to overtake safely.

Supply Chain Inefficiency: Congestion and Logistics Costs

In addition to the direct impacts of damage and accidents, ODOL creates negative externalities that damage the efficiency of the entire supply chain. Overloaded vehicles often travel at very low speeds (underspeed), especially on inclines, which is a major trigger for traffic congestion[9]. This congestion directly increases travel time, leading to higher operational costs (fuel and driver wages) and reducing delivery time reliability[20]. Ultimately, this increases the overall national logistics costs, which are already among the highest in the region. Furthermore, engines that work harder to carry excess loads consume more fuel and produce higher greenhouse gas emissions, which contradicts national climate commitments[11].

The annual loss of IDR 43 trillion is essentially an unintended hidden subsidy from the state (through the KemenPUPR budget) to the logistics sector. Logistics operators and goods owners engage in ODOL practices to reduce their direct operational costs and maximize revenue per trip[16]. However, this practice shifts the massive external costs—road

infrastructure repair costs—to the state. This mechanism allows businesses to privatize profits (higher revenues) while socializing losses (repair costs borne by taxpayers). This creates a perverse incentive structure, where the financial motivation for the private sector to comply with the rules becomes very minimal because they do not bear the actual costs of their operations. This makes the "economic argument" often made against the Zero ODOL policy a flawed perspective, as it overlooks the massive public expenditure required to support these inefficient and dangerous practices.

METHOD

This research uses a qualitative approach with a descriptive-analytical design to examine the phenomenon of Over Dimension Over Loading (ODOL) in Indonesia within the context of transportation and logistics policies. The main analysis method used is Soft Systems Methodology (SSM), which allows for the exploration of various views and perspectives on the complex ODOL policy. This study also incorporates the analysis of secondary quantitative data from law enforcement statistics, Weigh-in-Motion (WIM) data, government reports, and relevant empirical literature. The first stage involves data collection through a literature review from various verified sources, including academic articles, regulatory documents, government reports, and relevant international data. Subsequently, a situational analysis is conducted to identify the key issues and stakeholders involved, as well as to explore the root causes of ODOL through a CATWOE analysis. A conceptual model is developed by identifying the interventions needed in the policy, and a comparison is made between the conceptual model and the existing reality. In the final stage, policy recommendations are formulated based on evidence and input from the various stakeholders involved.

RESULT AND DISCUSSION

Law Enforcement in Transition: From Manual Checkpoints to Digital Surveillance

The effectiveness of law enforcement is key to the success of any regulation. In the context of Overload and Overdimension (ODOL) enforcement, the evolution of law enforcement mechanisms in Indonesia shows a shift from the traditional approach, which has proven to be ineffective, to the adoption of technology that promises a more effective, transparent, and resistant system against human intervention. This section will evaluate the systemic failures of the conventional system based on weighbridges and analyze the potential of digital technology as the future of ODOL surveillance.

Legacy System: Ineffectiveness of Conventional Weighbridge Operations (UPPKB)

The ODOL enforcement system that has been in place for decades in Indonesia relies on the network of the Motor Vehicle Weighting Units (UPPKB), more commonly known as weighbridges. However, this system has proven ineffective due to various fundamental issues. Operational and Technological Shortcomings: The existing UPPKB network is generally outdated and inadequate. Many facilities are technologically lagging, with weighing platforms that are too short or have insufficient load capacity to accommodate larger and heavier modern trucks.[39] Furthermore, the placement of UPPKB locations is often not strategic and does not align with key logistics corridors or trade routes, allowing many ODOL vehicles to easily bypass them.[41]`Lack of Deterrent Facilities: One of the most critical failures in the design of the UPPKB system is the lack of supporting infrastructure that could provide a deterrent effect. Most UPPKBs are not equipped with storage facilities for temporarily holding overloaded vehicles or large enough parking spaces to detain violators.[39]

As a result, even when violations are detected, the most common action taken is the imposition of fines, which are relatively small. After paying the fine, the overloaded truck is often allowed to continue its journey. This practice makes law enforcement more transactional than preventive, failing to create a significant deterrent effect.

Corruption and Human Factors: The manual nature of UPPKB operations, which involves face-to-face interactions between officers and drivers, makes it highly susceptible to illegal levies (pungli) and corruption.[40] This issue has become one of the main reasons cited by the Ministry of Transportation for considering the complete closure of weighbridges. Moreover, officers in the field often face conflicts, intimidation, and resistance from drivers who refuse to be checked and attempt to bypass the weigh stations.39 The combination of these problems significantly reduces the effectiveness of UPPKB in screening ODOL trucks.

Frontline Technology: Integration of Weigh-in-Motion (WIM) and ETLE

In response to the failures of the conventional system, the government is now turning to technology-based solutions that are expected to revolutionize the way ODOL enforcement is carried out. Two key technologies in this strategy are Weigh-in-Motion (WIM) and Electronic Traffic Law Enforcement (ETLE).

Technical Capabilities: The WIM system represents a paradigm shift in law enforcement. By embedding precision sensors into the road surface, this system is capable of accurately measuring the total weight of a vehicle, load per axle, and even the dimensions of the vehicle while it is moving at normal speed on the highway.[31] This eliminates the need to stop vehicles and direct them to weighbridges, thus preventing traffic disruption. When the WIM system is integrated with ETLE cameras, the law enforcement process can become fully automated. The ETLE cameras capture images of the vehicle and its license plate, after which the system automatically identifies the vehicle, records any violations (if applicable), and sends an electronic ticket to the registered vehicle owner's address.[44]

Implementation in Indonesia: The Indonesian government is actively in the process of implementing WIM technology, particularly on strategic toll roads and several national arterial roads, as the backbone of the future Zero ODOL strategy.46 This step is seen as the main solution to address inefficiencies, leaks, and corruption that have plagued the manual weighbridge system.[43]

International Precedents: This strategy aligns with best practices that have been globally adopted. Advanced countries like Germany, as well as neighboring countries like Malaysia, increasingly rely on WIM technology for both pre-screening and direct enforcement due to its advantages in efficiency, accuracy, and transparency.[50] International academic reviews confirm the high effectiveness of WIM-based enforcement. One case study showed a dramatic reduction in the number of overweight trucks by as much as 91% after the WIM system was implemented.[54]

The shift from manual UPPKB to the integrated WIM/ETLE system is more than just a technological upgrade; it is a strategic move to depersonalize the law enforcement process. The main failure of UPPKB is not only technical but also human; the system opened space for negotiations, intimidation, and corruption,[39] which made the probability of receiving meaningful sanctions very low. According to deterrence theory in law enforcement, the certainty of punishment is often more effective than the severity of the punishment itself.[55] The WIM/ETLE system automates detection and ticketing,[44] eliminating the "discretion" points where corruption could occur. By making detection and sanctions almost certain for every vehicle that violates and crosses the sensor, this system fundamentally changes the risk calculation for operators. The likelihood of getting caught and fined shifts from "low and negotiable" to "almost 100% and non-negotiable." Therefore, investing in WIM/ETLE technology is not just about efficiency; it is a direct attack on the culture of impunity that has

crippled ODOL enforcement for years. This technology targets the root cause of law enforcement failure—lack of certainty.

Redefining Accountability: Adopting the "Chain of Responsibility" (CoR) Principle

One of the most fundamental weaknesses of the current ODOL enforcement approach in Indonesia is its narrow focus on a single point in the supply chain.

Weakness of the Current Model: The current law enforcement predominantly targets truck drivers as the main perpetrators of violations.[17] However, drivers are often the weakest link in the logistics ecosystem. They are under immense pressure from truck owners, logistics operators, and especially cargo owners (shippers or consignors) who demand the lowest possible transportation costs to reduce production and distribution expenses.[16] Making the driver the sole target of enforcement ignores the source of economic pressures that drive ODOL practices.

The Chain of Responsibility (CoR) Framework: As an alternative, this report proposes the adoption of the Chain of Responsibility (CoR) principle, a legal framework successfully implemented in countries like Australia under the Heavy Vehicle National Law (HVNL).[56] The CoR principle legally extends the responsibility for safety violations (including ODOL) to every party that has control over or influence on transportation activities. This means accountability doesn't just stop at the driver, but also includes cargo owners, packing companies, loading operators, warehouse managers, and corporate executives.[62] The application of this principle aligns with the demands of industry associations such as the Indonesian Truck Entrepreneurs Association (Aptrindo), which has repeatedly stated that ODOL issues must be addressed comprehensively "from upstream to downstream" by holding cargo owners accountable.[29]

Proposed Model for Indonesia: The government needs to develop a legal framework for CoR in Indonesia, likely requiring amendments to Law 22/2009. Under this framework, it would be a legal violation for cargo owners to ship loads they know (or should reasonably know) will result in ODOL violations. This mechanism effectively shifts legal and financial risks upstream, directly to the source of economic pressures that drive the violations.

Table 2: Comparison of ODOL Enforcement and Accountability Models

Model	Responsibility Focus (Responsible Parties)	Main Enforcement Mechanism	Advantages	Disadvantages
Current Indonesian Model	Primarily on the Driver and Truck Operator	Manual Weighbridge (UPPKB), On-the-spot Fines	Simple in concept	Does not address root causes (economic pressure from cargo owners), prone to corruption, ineffective, low deterrent effect.
Proposed Chain of Responsibility (CoR) Model	All parties in the supply chain (Driver, Operator, Loader, Cargo Owner, Executives)	Integrated law enforcement (WIM/ETLE), safety management system audits, legal & financial penalties for all parties	Tackles root causes, promotes collective responsibility, creates compliance incentives throughout the supply chain	Requires significant legislative changes, extensive socialization, and more advanced law enforcement capacity.
International	All parties with	Risk-based	Highly	High legal

Model	Responsibility Focus (Responsible Parties)	Main Enforcement Mechanism	Advantages	Disadvantages
Benchmark: Australia (HVNL)	"influence and control" over transport tasks	enforcement, compliance audits, heavy fines for corporations and executive individuals	comprehensive, proven effective in changing industry culture, focus on proactive prevention	complexity, requires strong and independent regulators (NHVR).
International Benchmark: Malaysia (APAD/JPJ)	Driver, Operator, and beginning to target Cargo Owners (Consignee)	Combination of road enforcement and high-speed WIM (HS-WIM) implementation, progressive fines based on overload percentage	Adoption of advanced technology (WIM), expanding responsibility to cargo owners, more measured penalties	Implementation still under development, challenges in inter-agency enforcement integration.

Source: Processed from Law 22/2009 7, PH&H Analysis 17, CoR Guidelines & Journal 56, and Malaysia Regulations.[52]

Multimodal Catalysts: Leveraging Zero ODOL to Drive Modal Shift

The Zero ODOL policy should not be seen as a standalone end goal. Rather, it should be viewed as a powerful policy tool to trigger a broader transformation in the national logistics system, particularly in promoting a modal shift.

Excessive Dependence on Road Transportation: The current logistics system in Indonesia is highly imbalanced, with an overwhelming dependence on road transport. Rail, which is inherently more efficient, energy-saving, and environmentally friendly for long-distance, high-volume freight transportation, has a very small market share, around only 1% in Java Island.[67]

Barriers to Modal Shift: Several key barriers hinder the development of rail and sea-based freight transport. These include poor connectivity between rail lines and industrial areas or ports, double-handling costs at multimodal terminals, and the lack of integrated and reliable multimodal logistics operators.[67] Additionally, artificially low truck transport costs due to massive ODOL practices continue to undermine the competitiveness of rail and sea transport.

ODOL Enforcement as a Driver for Change: The firm and consistent implementation of the Zero ODOL policy will inevitably increase the real cost of road transport. This will force businesses to reconsider their logistics costs and seek more efficient alternatives. The rise in road transport costs will automatically make other modes of transport, such as rail and short sea shipping, more attractive and economically competitive.[67] Industry players themselves acknowledge that a shift to alternative modes will become inevitable if ODOL practices are truly eliminated.[67] Therefore, the Zero ODOL policy should be positioned not just as a regulatory measure, but as a strategic lever to accelerate the national multimodal transport agenda.

A Comprehensive Roadmap for a Zero ODOL Indonesia

To ensure the transition towards a Zero ODOL Indonesia is smooth and does not cause harmful economic shocks, the government needs to formulate and implement a comprehensive, realistic roadmap supported by all stakeholders.

Phased Implementation: A "big bang" approach or nationwide simultaneous enforcement carries high political and economic risks. A phased implementation approach will be easier to manage and can mitigate short-term negative impacts. This phasing could be based on geographical corridors (for example, starting with the main toll roads in Java) or by commodity types, as suggested by Aptrindo.[69]

Fiscal and Non-Fiscal Incentives: To address business concerns and encourage the transition, the government must design an attractive incentive package. In line with suggestions from Aptrindo, these incentives could include fiscal incentives such as tax reductions for purchasing new trucks that comply with standards and have multi-axle configurations, as well as non-fiscal incentives like toll discounts or service priorities at ports for operators that demonstrate compliance.[29]

Strengthening Inter-Ministerial Collaboration: Ad-hoc and reactive coordination has proven insufficient. A permanent institution, such as a National ODOL Task Force (Satgas), should be established, led by one of the Coordinating Ministries, with binding authority over the Ministry of Transportation (Kemenhub), Ministry of Public Works (KemenPUPR), Ministry of Industry (Kemenperin), and Ministry of Trade (Kemendag).[11] This task force would be responsible for overseeing the implementation of the roadmap, mediating policy disputes, and monitoring progress periodically based on objective data and analysis, including findings from BPS studies.

The successful implementation of the Zero ODOL policy is not an end in itself but a fundamental step towards creating a rational, safe, and sustainable national logistics system. The current system is irrational: it relies on inefficient modes (ODOL trucks) that actively destroy their own infrastructure, creating a vicious cycle of high costs and danger.[19] Enforcing Zero ODOL will correct the price signals in land transportation by forcing operators to internalize the true costs of transporting goods legally. This price correction will make more efficient modes, such as rail for long distances and compliant trucks for last-mile delivery, more economically viable.[67] This will trigger investments and innovations in multimodal infrastructure and services in line with market demand. The long-term result will be a more balanced, efficient, and globally competitive national logistics network, which is the ultimate goal of any multimodal transport policy. Thus, ODOL is a critical bottleneck that, if successfully addressed, can pave the way for a series of positive systemic transformations.

Table 3: Quantifying the Annual Impact of ODOL in Indonesia

Impact Metric	Annual Figure	Year of Data	Source
Direct Financial Loss (Infrastructure Maintenance)	Rp 43.47 Trillion	2024-2025	KemenPUPR, Menko Infrastructure
Estimated Reduction in Road Lifespan	From 10-11 years to 3 years	2025	Ditjen Bina Marga, KemenPUPR
Number of Accidents Involving Freight Transportation	27,337 incidents	2024	Korlantas Polri
Number of Fatalities Related to ODOL	6,390 fatalities	2024	Jasa Raharja

Source: Processed from Law 22/2009 7, PH&H Analysis 17, Journal & CoR Guidelines 56, and Malaysia Regulations.[52]

CONCLUSION

The issue of Over Dimension Over Loading (ODOL) in Indonesia has become a systemic problem that harms the national economy, causes infrastructure damage, leads to fatal accidents, and creates inefficiencies in the national supply chain. ODOL practices have become the norm in the freight transportation industry, despite clear regulations, due to non-compliance caused by governance failures, weak law enforcement systems, and inaccuracies in accountability. To address this issue, this study recommends the formation of a National Task Force for ODOL Management, the adoption of the "Chain of Responsibility" (CoR) principle within the legal framework, the acceleration of the implementation of monitoring technologies such as Weigh-in-Motion (WIM) and ETLE, and the integration of the Zero ODOL policy with multimodal transportation agendas to promote the shift of transportation modes from roads to rail and sea.

The implementation of the Zero ODOL policy should be carried out gradually with clear fiscal and non-fiscal incentives, as well as the creation of an inclusive implementation roadmap. This approach aims to create a safe, efficient, and sustainable logistics system by enhancing law enforcement, improving incentive structures, and supporting the transition to more environmentally friendly transportation modes. The success of this policy depends on strong political commitment and effective cross-sectoral coordination to achieve larger national goals, such as building safe infrastructure, reducing accidents, and improving Indonesia's economic competitiveness.

REFERENCE

1] UU Nomor 22 Tahun 2009.pdf - Peraturan BPK, accessed October 7, 2025, https://peraturan.bpk.go.id/Download/27961/UU%20Nomor%2022%20Tahun%202009.pdf
2] UNDANG-UNDANG REPUBLIK INDONESIA NOMOR 22 TAHUN 2009 TENTANG LALU LINTAS DAN ANGKUTAN JALAN DENGAN RAHMAT TUHAN YANG MAHA ESA PR, accessed October 7, 2025, https://dishub.malangkota.go.id/wp-content/uploads/sites/16/2016/05/Undang-Undang-No.-22-tahun-2009-Tentang-Lalulintas.pdf
3] BAB I PENDAHULUAN - unmas, accessed October 7, 2025, https://eprints.unmas.ac.id/6693/1/R.392.Teknik-Sipil_BAB%20I-II.pdf
4] PERATURAN PEMERINTAH REPUBLIK INDONESIA, accessed October 7, 2025, https://peraturan.bpk.go.id/Download/35169/PP%20Nomor%2055%20Tahun%202012.pdf
5] presiden - republik indonesia - JDIH Mahkamah Agung, accessed October 7, 2025, https://jdih.mahkamahagung.go.id/storage/uploads/produk_hukum/file/PP_55_2012.pdf
6] DIMENSI KENDARAAN MEWUJUDKAN KENDARAAN ..., accessed October 7, 2025, https://dishub.salatiga.go.id/wp-content/uploads/2020/11/Teknik-Pengukuran-Dimensi-Kendaraan-Bermotor-1.pdf
7] Ini Dasar Hukum dan Sanksi buat Pelaku ODOL - Kompas Otomotif, accessed October 7, 2025, https://otomotif.kompas.com/read/2025/05/19/091200515/ini-dasar-hukum-dan-sanksi-buat-pelaku-odol
8] Regulasi & Sanksi Berat Truk ODOL Jika Dilanggar - Djatgo, accessed October 7, 2025, https://djatgo.id/regulasi-sanksi-berat-truk-odol-jika-dilanggar/
9] STOP Over Dimension Over Loading (ODOL) - Dinas Perhubungan Kabupaten Sleman, accessed October 7, 2025, https://perhubungan.slemankab.go.id/stop-over-dimension-over-loading-odol/
10] Jelang Zero ODOL 2023, Kemenhub Terus Sosialisasikan Penegakan Hukum Truk

ODOL, accessed October 7, 2025, https://dephub.go.id/post/read/jelang-zero-odol-2023,-kemenhub-terus-sosialisasikan-penegakan-hukum-truk-odol
11] Menuju Transportasi Logistik yang Aman dan Efisien: Urgensi Implementasi Kebijakan Zero ODOL, accessed October 7, 2025, https://baketrans.kemenhub.go.id/publikasi/view/menuju-transportasi-logistik-yang-aman-dan-efisien-urgensi-implementasi-kebijakan-zero-odol
12] UNDERSTANDING TRUCK OVERLOADING BEHAVIOUR AND ITS CONTROL : A REVIEW OF PREVIOUS STUDIES, accessed October 7, 2025, https://binamarga.pu.go.id/jurnal/index.php/jurnaljalanjembatan/article/download/339/234/1217
13] Effect of Overloaded Vehicles on Flexible Pavements Service Life Using Weigh-In-Motion Data, accessed October 7, 2025, https://www.trijournal.ir/article_125636_en.html
14] Investigating Factors Affecting Road Freight Overloading Through the Integrated Use of BLR and Cart: A Case Study in China - Digital Commons @ USF - University of South Florida, accessed October 7, 2025, https://digitalcommons.usf.edu/cgi/viewcontent.cgi?article=1072&context=egx_facpub
15] BPS Kaji Dampak Zero ODOL ke Inflasi dan Biaya Logistik - CNN Indonesia, accessed October 7, 2025, https://www.cnnindonesia.com/ekonomi/20251006161115-532-1281561/bps-kaji-dampak-zero-odol-ke-inflasi-dan-biaya-logistik
16] MASALAH ODOL, PANDANGAN DARI BIAYA LOGISTIK - PH&H, accessed October 7, 2025, https://phhpublicpolicy.co.id/2023/12/12/masalah-odol-pandangan-dari-biaya-logistik-oleh-phh/
17] "ODOL PERSOLAN TAK KUNJUNG USAI KARENA KEBIJAKAN ..., accessed October 7, 2025, https://phhpublicpolicy.co.id/2025/06/30/odol-persolan-tak-kunjung-usai-karena-kebijakan-tidak-komprehensif-dan-belum-ada-peta-jalan-penanganan/
18] Negara Rugi Rp43 Triliun Akibat Jalan Rusak Dilindas ODOL, Jangan Dibiarkan! - Unika, accessed October 7, 2025, https://www.unika.ac.id/news/media-massa/online/negara-rugi-rp43-triliun-akibat-jalan-rusak-dilindas-odol-jangan-dibiarkan/
19] Kerugian akibat ODOL Tembus Rp 43,45 Triliun Per Tahun, accessed October 7, 2025, https://www.kompas.com/properti/read/2025/05/06/230431521/kerugian-akibat-odol-tembus-rp-4345-triliun-per-tahun
20] ODOL Bikin Negara Rugi hingga Rp 43 Triliun per Tahun - Kompas.com, accessed October 7, 2025, https://www.kompas.com/properti/read/2025/06/24/200000021/odol-bikin-negara-rugi-hingga-rp-43-triliun-per-tahun
21] Negara Rugi Rp 43 Triliun Setahun Gara-gara Truk ODOL - Kompas Money, accessed October 7, 2025, https://money.kompas.com/read/2025/06/25/144406126/negara-rugi-rp-43-triliun-setahun-gara-gara-truk-odol
22] Kemenhub: Masalah truk ODOL harus selesai tahun 2023 - ANTARA News, accessed October 7, 2025, https://www.antaranews.com/berita/2060782/kemenhub-masalah-truk-odol-harus-selesai-tahun-2023
23] (PDF) Combating Overloaded Vehicles on the Roads – Potential ..., accessed October 7, 2025, https://www.researchgate.net/publication/391439490_Combating_Overloaded_Vehicles_on_the_Roads_-_Potential_Economic_Benefits
24] Menhub: 27.337 Kecelakaan Lalu Lintas Melibatkan Angkutan Barang - Tempo.co, accessed October 7, 2025, https://www.tempo.co/ekonomi/menhub-27-337-kecelakaan-lalu-lintas-melibatkan-angkutan-barang-1825423
25] (PDF) Sustainable Truck Overload Management Framework - ResearchGate, accessed October 7, 2025, https://www.researchgate.net/publication/388926473_Sustainable_Truck_Overload_Man

agement_Framework
26] Pahami Mengenai Regulasi Truk ODOL serta Konsekuensinya - Isuzu Indonesia, accessed October 7, 2025, https://isuzu-astra.com/regulasi-truk-odol/
27] KEMENHUB SIAPKAN LANGKAH STRATEGIS WUJUDKAN ..., accessed October 7, 2025, https://dephub.go.id/post/read/kemenhub-siapkan-langkah-strategis-wujudkan-program-bebas-odol-tahun-2023
28] ARTIKEL TRANSPORTASI: Implementasi Kebijakan "Zero Odol" di Indonesia, accessed October 7, 2025, https://transportasi.ulbi.ac.id/page/berita/implementasi-kebijakan-%22zero-odol%22-di-indonesia
29] Aptrindo Minta Menhub Tak Menyudutkan Pengusaha Truk Ihwal Permasalahan ODOL, accessed October 7, 2025, https://www.tempo.co/ekonomi/aptrindo-minta-menhub-tak-menyudutkan-pengusaha-truk-ihwal-permasalahan-odol-1825458
30] Permen PUPR No. 5 Tahun 2023 - Peraturan BPK, accessed October 7, 2025, https://peraturan.bpk.go.id/Details/257264/permen-pupr-no-5-tahun-2023
31] Wujudkan Jalan Berkelas, Menuju Indonesia Emas - Direktorat Jenderal Bina Marga - Kementerian Pekerjaan Umum, accessed October 7, 2025, https://binamarga.pu.go.id/index.php/berita/wujudkan-jalan-berkelas-menuju-indonesia-emas
32] Kelebihan Muatan Penyebab Kerusakan Jalan, Pemprovsu Dukung Kolaborasi Menuju Zero ODOL 2027 - WASPADA, accessed October 7, 2025, https://www.waspada.id/medan/kelebihan-muatan-penyebab-kerusakan-jalan-pemprovsu-dukung-kolaborasi-menuju-zero-odol-2027/
33] Tentang Kami - - Kementerian Koordinator Bidang Perekonomian Republik Indonesia, accessed October 7, 2025, https://www.ekon.go.id/profil/1/tentang-kami
34] Kembangkan Ekonomi Sirkular, Kemenko Marves bersama PLN Energi Primer Indonesia Kuatkan Ekosistem Biomassa - Kementerian Koordinator Bidang Kemaritiman dan Investasi, accessed October 7, 2025, https://maritim.go.id/detail/kembangkan-ekonomi-sirkular-kemenko-marves-bersama-pln-energi-primer-indonesia-kuatkan-ekosistem-biomassa
35] Sinergitas program Kemenko PMK dan Kemenko Marves percepat pencapaian agenda pembangunan nasional | Kementerian Koordinator Bidang Pembangunan Manusia dan Kebudayaan, accessed October 7, 2025, https://www.kemenkopmk.go.id/sinergitas-program-kemenko-pmk-dan-kemenko-marves-percepat-pencapaian-agenda-pembangunan-nasional
36] Menko AHY: Kajian dampak kebijakan nihil ODOL rampung Desember 2025, accessed October 7, 2025, https://www.antaranews.com/berita/5157485/menko-ahy-kajian-dampak-kebijakan-nihil-odol-rampung-desember-2025
37] Kajian Dampak Zero ODOL BPS Rampung Desember 2025: AHY Ungkap Potensi Positif Ekonomi dan Keselamatan - MerahPutih, accessed October 7, 2025, https://www.merahputih.com/post/read/kajian-dampak-zero-odol-bps-rampung-desember-2025-ahy-ungkap-potensi-positif-ekonomi-dan-keselamatan
38] Kebijakan Zero ODOL Bisa Dorong Pertumbuhan Ekonomi Nasional - BeritaSatu.com, accessed October 7, 2025, https://www.beritasatu.com/ekonomi/2928860/kebijakan-zero-odol-bisa-dorong-pertumbuhan-ekonomi-nasional
39] BAB I PENDAHULUAN - Politeknik Keselamatan Transportasi Jalan, accessed October 7, 2025, http://eprints.pktj.ac.id/2766/2/20011036-SKRIPSI-BAB_1.pdf
40] Memangkas Pungli Jembatan Timbang Dengan Solusi IT – SCU - Unika, accessed October 7, 2025, https://www.unika.ac.id/news/media-massa/online/memangkas-pungli-jembatan-timbang-dengan-solusi-it/
41] Strategi Pelindungan Industri Manufaktur dalam Menghadapi Kebijakan Tarif Impor AS -

PARLIAMENTARY REVIEW, accessed October 7, 2025, https://berkas.dpr.go.id/pusaka/files/parliamentary_review/Parliamentary%20Review-VII-2-J-2025.pdf
42] Menhub Minta Kualitas Pelayanan Jembatan Timbang Ditingkatkan, accessed October 7, 2025, https://dephub.go.id/post/read/menhub-minta-kualitas-pelayanan-jembatan-timbang-ditingkatkan
43] Jembatan Timbang Akan Dibubarkan, Efektivitas Pengawasan Angkutan Barang Dipertanyakan - Majalah Lintas, accessed October 7, 2025, https://www.majalahlintas.com/jembatan-timbang-akan-dibubarkan-efektivitas-pengawasan-angkutan-barang-dipertanyakan/
44] Integrasi WIM dengan ETLE: Inovasi Pengawasan ODOL Secara Digital, accessed October 7, 2025, https://dct.co.id/news/integrasi-wim-dengan-etle-inovasi-pengawasan-odol-secara-digital/
45] Keunggulan Teknologi Weigh In Motion (WIM) by VanJee dalam Mendeteksi Kendaraan ODOL - PT DCT Total Solutions, accessed October 7, 2025, https://dct.co.id/news/keunggulan-teknologi-weigh-in-motion-wim-by-vanjee-dalam-mendeteksi-kendaraan-odol/
46] Kemenhub Pasang Teknologi Weigh in Motion di Kulon Progo, Apa Fungsinya? - Detikcom, accessed October 7, 2025, https://www.detik.com/jateng/berita/d-5915557/kemenhub-pasang-teknologi-weigh-in-motion-di-kulon-progo-apa-fungsinya
47] Evaluasi Efektivitas Penerapan Teknologi Weigh in Motion (WIM) dalam Pengawasan Truk ODOL di UPPKB Kulwaru, Kulon Progo, accessed October 7, 2025, https://snti.ft.ugm.ac.id/evaluasi-efektivitas-penerapan-teknologi-weigh-in-motion-wim-dalam-pengawasan-truk-odol-di-uppkb-kulwaru-kulon-progo/
48] TERAPKAN TEKNOLOGI WEIGH-IN-MOTION, KENDARAAN ODOL YANG MASUK VIA GT LEMATANG AKAN DIPUTARBALIKKAN - Hutama Karya, accessed October 7, 2025, https://www.hutamakarya.com/terapkan-teknologi-weigh-in-motion-kendaraan-odol-yang-masuk-via-gt-lematang-akan-diputarbalikkan
49] Kemenhub Sebut Jembatan Timbang Tidak Efektif Menjaring Truk ODOL | IDN Times, accessed October 7, 2025, https://www.idntimes.com/business/economy/kemenhub-sebut-jembatan-timbang-tidak-efektif-menjaring-truk-odol-00-brqf5-6dy988
50] Smart Enforcement in Transport: How Technology is Improving Safety and Compliance, accessed October 7, 2025, https://setoproject.eu/2025/06/smart-enforcement-in-transport-how-technology-is-improving-safety-and-compliance/
51] Commercial Motor Vehicle Size and Weight Enforcement in Europe - International Programs, accessed October 7, 2025, https://international.fhwa.dot.gov/pubs/pl07002/vsw_eu07.pdf
52] Why are lorries more dangerous on the road? A deep dive into the risks, penalties, and new laws in the pipeline, accessed October 7, 2025, https://malaysia.news.yahoo.com/why-lorries-more-dangerous-road-230000127.html
53] From new weigh-in system to stricter laws: How Putrajaya plans to better regulate heavy vehicles after major crashes - Yahoo News Malaysia, accessed October 7, 2025, https://malaysia.news.yahoo.com/weigh-system-stricter-laws-putrajaya-230000422.html
54] Overloading Control Effectiveness of Overweight Enforcement System using High-Speed Weigh-In-Motion - ResearchGate, accessed October 7, 2025, https://www.researchgate.net/publication/264186266_Overloading_Control_Effectiveness_of_Overweight_Enforcement_System_using_High-Speed_Weigh-In-Motion
55] Economics of Overloading and the Effect of Weight Enforcement: Research Note - PDXScholar, accessed October 7, 2025, https://pdxscholar.library.pdx.edu/cgi/viewcontent.cgi?article=1004&context=cus_pubs

56] Chain of Responsibility (CoR) - | NHVR, accessed October 7, 2025, https://www.nhvr.gov.au/safety-accreditation-compliance/chain-of-responsibility
57] Complying with Chain of Responsibility legislation - Service NSW, accessed October 7, 2025, https://www.service.nsw.gov.au/referral/complying-with-chain-of-responsibility-legislation
58] Understanding the Chain of Responsibility in Transport Safety - SafetyDocs by SafetyCulture, accessed October 7, 2025, https://safetydocs.safetyculture.com/blog/understanding-the-chain-of-responsibility-in-transport-safety/
59] Regulatory Advice - | NHVR, accessed October 7, 2025, https://www.nhvr.gov.au/safety-accreditation-compliance/chain-of-responsibility/regulatory-advice
60] Understanding Your Role in the Chain of Responsibility | NTI Limited, accessed October 7, 2025, https://www.nti.com.au/news-and-resources/blog/2024/understanding-your-role-in-the-chain-of-responsibility
61] Chain of Responsibility (COR) provisions within the Heavy Vehicle National Law (HVNL), accessed October 7, 2025, https://watkinstaylorstone.com.au/chain-of-responsibility-cor-provisions-within-the-heavy-vehicle-national-law-hvnl/
62] The Chain of Responsibility in Land Transportation Associated with ..., accessed October 7, 2025, https://jurnal.fh.unila.ac.id/index.php/aelr/article/download/2887/1949/12006
63] (PDF) Chain of Responsibility in Land Transportation Associated with Overloading Activities, accessed October 7, 2025, https://www.researchgate.net/publication/369579356_Chain_of_Responsibility_in_Land_Transportation_Associated_with_Overloading_Activities
64] The Chain of Responsibility in Land Transportation Associated with Overloading Cases, accessed October 7, 2025, https://jurnal.fh.unila.ac.id/index.php/aelr/article/view/2887
65] APTRINDO Nilai Kebijakan Zero ODOL Kurang Adil - KabarBursa.com, accessed October 7, 2025, https://www.kabarbursa.com/makro/aptrindo-nilai-kebijakan-zero-odol-kurang-adil
66] EasyChair Preprint Effectiveness of Land Public Transport Act 2010 to the Case of Overloading, accessed October 7, 2025, https://easychair.org/publications/preprint/wQLX/open
67] Breaking down Barriers to Climate-friendly Freight Transport in ..., accessed October 7, 2025, https://changing-transport.org/breaking-down-the-barriers-to-climate-friendly-freight-transport-in-indonesia/
68] Analysis of the barriers to multimodal freight transport and their mitigation strategies - DTU Orbit, accessed October 7, 2025, https://orbit.dtu.dk/files/344655301/s12544-023-00614-0.pdf
69] APTRINDO Minta Penegakan Odol Tak Kaku - RRI, accessed October 7, 2025, https://rri.co.id/nasional/1627059/aptrindo-minta-penegakan-odol-tak-kaku
70] Aptrindo Beberkan Masalah dalam Penertiban ODOL: Tak Ada Keadilan dan Regulasi yang Jelas | tempo.co, accessed October 7, 2025, https://www.tempo.co/ekonomi/aptrindo-beberkan-masalah-dalam-penertiban-odol-tak-ada-keadilan-dan-regulasi-yang-jelas-1825488