violation has a very strong and direct correlation level. The coefficient of determination (R) X1 towards Y for 67.4%, means that the main dimensions violation has the effect of 67.4% against the load violation.

The criteria of the correlation coefficient test are, Ho can be accepted if: -1.96 < Zo < 1.96. It means that the sample is not related to the population. Ho is rejected if Zo > 1.96 or Zo < -1.96, which means that the sample is related to the population.

Z Test Value Calculation

$$\mathbf{Zo} = \frac{0,821}{\sqrt{1/7 - 1}} \tag{5}$$

Zo value of 2.04 > 1.96 means that the sample is related to the population.

3) Analysis of interview results: The survey at Widang Weighbridge takes 84 drivers as the sample. The result of the study is presented in the following Figure.



Fig. 7 Results of the ODOL Violation Survey at Widang Weighbridge



Fig. 8 Results of the ODOL Violation Survey at the Losarang Weighbridge

The results of an interview survey at the Losarang Weighbridge, with a sample of 75 drivers, 48 of them knew that their vehicles had violated the load standard and/or dimension violation. The rest 52 drivers answered that they did not understand it.

IV. CONCLUSION

Based on the result above, it can be concluded that the type of vehicle which has the highest level of load violation at Widang Weighbridge is a Large Truck, while at Losarang weighbridge is Light Truck. The violations are in the form of changes in the main dimensions and tire size addition. However, the most frequently violated dimensions are changes in the main dimensions, such as the addition of length, width, and/or height of the vehicle. The statistical analysis of regression and correlation shows a significant relationship between vehicle dimension violation in the form of the main dimension addition (over-dimension) with load violations (overloading).

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References

- C. M. Krause and L. Zhang, "Short-term travel behavior prediction with GPS, land use, and point of interest data," *Transp. Res. Part B*, vol. 123, no. 76, pp. 349–361, 2019.
- [2] C. J. Nash and D. J. Cole, "Identification and validation of a driver steering control model incorporating human sensory dynamics," *Int. J. Veh. Mech. Mobil.*, vol. 31, no. 14, pp. 495–517, 2020.
- [3] D. Milne et al., "The influence of variation in track level and support system stiffness over longer lengths of track for track performance and vehicle track interaction and vehicle track interaction," Veh. Syst. Dyn., vol. 10, no. 3, pp. 1–24, 2019.
- [4] Y. Wang, W. Y. Szeto, K. Han, and T. L. Friesz, "Dynamic traffic assignment: A review of the methodological advances for environmentally sustainable road transportation applications," *Transp. Res. Part B*, vol. 111, no. 33, pp. 370–394, 2018.
- [5] I. Simanjuntak, "Analysis of the Effect of Overloading on Road Performance and Age of a Flexible Pavement Plan (Case Study of Pringsurat Highway, Ambarawa-Magelang)," J. Civ. Eng., vol. 5, no. 13, pp. 88–99, 2014.
- [6] V. Fors, B. Olofsson, L. Nielsen, V. Fors, and B. Olofsson, "Attainable force volumes of optimal autonomous at-the-limit vehicle manoeuvres vehicle manoeuvres," *J. Heavy Veh.*, vol. 12, no. 34, pp. 517–528, 2019.
- [7] M. of Transportation, Road Traffic and Transport. Indonesia, 2009.
- [8] W. Zhai, Z. Han, Z. Chen, L. Ling, and S. Zhu, "Train track bridge dynamic interaction : a state-of- the-art review," *Int. J. Veh. Mech. Mobil.*, vol. 56, no. 12, pp. 984–1027, 2019.
- [9] G. Morrison, D. Cebon, G. Morrison, and D. Cebon, "Sideslip estimation for articulated heavy vehicles at the limits of adhesion," *Veh. Syst. Dyn.*, vol. 54, no. 11, pp. 1601–1628, 2016.
- [10] M. Mahmoudi, J. Chen, T. Shi, and Y. Zhang, "A cumulative service state representation for the pickup and delivery problem with transfers," *Transp. Res. Part B*, vol. 129, no. 87, pp. 351–380, 2019.
- [11] L. I. Harlyan, "Statistical Hypothesis Test (MAM 4137) Dept. Malang Fisheries and Marine Resource Management," Malang, 2013.
- [12] Ministry of Transportation, Vehicles. 2012, p. 55.
- [13] S. F. A. Batista, L. Leclercq, and N. Geroliminis, "Estimation of regional trip length distributions for the calibration of the aggregated network traffic models," *Transp. Res. Part B*, vol. 122, no. 12, pp. 192–217, 2019.
- [14] S. Kharrazi, B. Augusto, and N. Fröjd, "Vehicle dynamics testing in motion based driving simulators," *Veh. Syst. Dyn.*, vol. 58, no. 1, pp. 92–107, 2020.
- [15] J. W. Creswell, Educational research: Planning, conducting, and evaluating quantitative and qualitative research (4th ed.), 4th ed. Boston, MA: Pearson, 2012.
- [16] D. G. of L. Transportation, Provisions Regarding Bulk Goods Transportation. Indonesia, 2003, p. 56.
- [17] H. Bergland and P. Andreas, "Efficiency and traffic safety with pay for performance in road transportation," *J. Transp.*, vol. 130, no. 34, pp. 21–35, 2019.
- [18] M. Paipuri and L. Leclercq, "Bi-modal macroscopic traffic dynamics in a single region," J. Civ. Enggineering Forum, vol. 133, no. 67, pp. 257–290, 2020.
- [19] K. Satsukawa, K. Wada, and T. Iryo, "Stochastic stability of dynamic user equilibrium in unidirectional networks: Weakly acyclic game approach R," *Transp. Res. Part B*, vol. 125, no. 43, pp. 229–247, 2019.
- [20] T. Chugh, F. Bruzelius, M. Klomp, and B. Shyrokau, "An approach to develop haptic feedback control reference for steering systems using open-loop driving manoeuvres," *Veh. Syst. Dyn.*, vol. 11, no. 4, pp. 345–355, 2019.
- [21] H. J. U. Dewi, "Evaluation of the Effects of Floods, Overload, and Quality of Construction on Road Conditions," *Transp. J.*, vol. 4, no. 17, pp. 45–57, 2017.
- [22] G. Morrison, D. Cebon, G. Morrison, and D. Cebon, "Sideslip estimation for articulated heavy vehicles at the limits of adhesion," *Int. J. Veh. Mech. Mobil.*, vol. 54, no. 11, pp. 1601–1628, 2016.