

A blue ballpoint pen with a silver-colored tip and barrel is positioned diagonally on the left side of the page. The background is a light blue document featuring a bar chart with several vertical bars of varying heights. The text is centered on the right side of the page.

***Study Of The Track Access Charge (TAC) Formulation
On The Use Of Railway Infrastructure***

Research and Development of Road & Railway Transportation Agency
Research and Development Ministry of Transportation, JAKARTA, 21 January 2020

BACKGROUND

- Based on the explanation of Law no. 23/2007 Article 154 paragraph (1) Costs for the use of railway infrastructure or what is known as Track Access Charge (TAC) are fees that must be paid by the rolling stock's Operator for the use of railway infrastructure owned or operated by the Railway Infrastructure Operator.
- The formula contained in Government Regulation 5 of 2016 concerning Types and Rates of Non-Tax State Revenues Applicable to the Ministry of Transportation after being simplified is interpreted to be $TAC = 0.75$ IMO, this is not in accordance with Article 159 paragraph (1) of PP 61/2016 states whereas the guideline for determining the cost of railway infrastructure use is calculated based on infrastructure usage charges which have an impact on maintenance costs, operating costs, infrastructure depreciation by taking into account the priority of the use of railway infrastructure. Therefore a formula is needed in accordance with PP 61/2016 to calculate the real load for the use of railway infrastructure.

EXISTING TAC FORMULA (PP 5 TAHUN 2016)

$$TAC_{KA} = \left[GT_{KA} \times \sum_{i=1} (KM_{KA} \times TAC_{Daop/Divre}) \right] \times Fp$$

$$TAC_{KA} = \left[GT_{KA} \times \sum_{i=1} \left(KM_{KA} \times \left(\frac{IM + IO + ID}{GT_{KA} \times KM_{KA}} \right) \right) \right] \times Fp$$

$$TAC_{KA} = \left[\cancel{GT_{KA}} \times \sum_{i=1} \left(\cancel{KM_{KA}} \times \left(\frac{IM + IO + ID}{\cancel{GT_{KA}} \times \cancel{KM_{KA}}} \right) \right) \right] \times Fp$$

$$TAC_{KA} = [IM + IO + ID] \times Fp$$

$$TAC_{KA} = IMO \times Fp$$

TAC = 75% IMO

**PERATURAN PEMERINTAH NOMOR PP 61 TAHUN 2016 TENTANG PERUBAHAN ATAS PERATURAN
PEMERINTAH NOMOR PP.72 TAHUN 2009 TENTANG LALU LINTAS DAN ANGKUTAN KERETA API**

Pasal 159

- (1) Apabila penyelenggara sarana perkeretaapian menggunakan prasarana perkeretaapian yang dimiliki atau dioperasikan oleh penyelenggara prasarana perkeretaapian, penyelenggara sarana perkeretaapian harus membayar biaya penggunaan prasarana perkeretaapian.
- (2) Besarnya biaya penggunaan prasarana perkeretaapian sebagaimana dimaksud pada ayat (1) dihitung berdasarkan pedoman penetapan biaya penggunaan prasarana perkeretaapian yang ditetapkan oleh Menteri.
- (3) Pedoman penetapan biaya penggunaan prasarana perkeretaapian sebagaimana dimaksud pada ayat (2) dihitung berdasarkan beban penggunaan prasarana yang berdampak pada biaya perawatan, biaya pengoperasian, dan penyusutan prasarana dengan memperhitungkan prioritas penggunaan prasarana perkeretaapian.

Pasal 160

Ketentuan lebih lanjut mengenai biaya penggunaan prasarana diatur dengan peraturan Menteri.

RESEARCH QUESTION, RESEARCH PURPOSES, & RESEARCH METHODOLOGY

- Research Question: What is the formula and unit cost of using the ideal TAC?
- research purposes is to formulate recommendations for formulas and cost components that form the basis for calculating the TAC.
- The analysis used to complete this research is a qualitative description by describing the conditions of the frequency of the passing trains and the tonnage that is the burden of the railway infrastructure to be used as a reference for TAC' revenue.

Adjustments to PP 15 of 2016 concerning Types and Rates of Non-Tax State Revenues Applicable to the Ministry of Transportation

PP 15 Tahun 2016 Psl.2 ayat 2,3 dan 4

- (2) Tarif atas jenis Penerimaan Negara Bukan Pajak sebagaimana dimaksud pada ayat (1) huruf a dihitung dengan formula sebagai berikut:

$$TAC_{KA} = \left[GT_{KA} \times \sum_{i=1}^n (KM_{KA} \times TAC_{Daop/Divre}) \right] \times Fp$$

$$TAC_{Daop/Divre} = \frac{\text{Total Biaya Penggunaan Prasarana Perkeretaapian Tahunan Daop/Divre}}{\sum_{j=1}^n \text{Passing Tonnage}_j \times \text{Panjang Koridor Daop/Divre Sesuai Lintas Pelayanan}}$$

$$TAC_{Daop/Divre} = IM_{Daop/Divre} + IO_{Daop/Divre} + ID_{Daop/Divre}$$

$$IM_{Daop/Divre} = \frac{\text{Biaya perawatan prasarana perkeretaapian tahunan per Daop/Divre}}{\sum_{j=1}^n \text{Passing Tonnage}_j \times \text{Panjang Koridor Daop/Divre Sesuai Lintas Pelayanan}}$$

$$IO_{Daop/Divre} = \frac{\text{Biaya pengoperasian prasarana perkeretaapian tahunan per Daop/Divre}}{\sum_{j=1}^n \text{Passing Tonnage}_j \times \text{Panjang Koridor Daop/Divre Sesuai Lintas Pelayanan}}$$

$$ID_{Daop/Divre} = \frac{\text{Biaya penyusutan prasarana perkeretaapian tahunan per Daop/Divre}}{\sum_{j=1}^n \text{Passing Tonnage}_j \times \text{Panjang Koridor Daop/Divre Sesuai Lintas Pelayanan}}$$

- (3) Besaran Faktor Prioritas (Fp) maksimal 0,75 (nol koma tujuh lima) ditetapkan oleh Menteri Perhubungan dengan mempertimbangkan keberlangsungan Badan Usaha.
- (4) Besaran biaya penyusutan (ID) ditetapkan oleh Menteri Perhubungan kecuali untuk badan usaha milik negara di bidang perkeretaapian ditetapkan sebesar Rp0,00 (nol rupiah).

New Formulation of TAC Calculation

$$TAC_{KA} = GT_{KA} \times KM_{KA} \times \text{Satuan Biaya Penggunaan Prasarana KA (Rp/GT.Km)} \times \text{Faktor Prioritas Penggunaan}$$

The value of the Unit Cost for the Use of Railway Infrastructure is Rp. 57.69 / GT, Km and the value of the Priority Factor are stipulated as part of the attachment to PP 15/2016

BASIC VARIABLES FOR CALCULATING THE UNIT COST FOR THE USE OF RAILWAY INFRASTRUCTURE

No.	Variable	Reference	Unit	Value
1	Max Passing Tonage of Railway	PM 60 Tahun 2012 Tentang Persyaratan Teknis Jalur KA (Lampiran 1.5)	GrossTon/ day	20.000.000.000 Ton/ year Or 54.794,52 Ton/hari
2	depreciation	Determined based on the average asset value and the average technical age of the railway infrastructure (determined as an average of 50 years)	Rp/GrossTon.Km.day	Rp. 858.282.763,77/year Or Rp.42,91/GT.Km.Hari
3	Average maintenance (IM) and operational (IO) needs of infrastructure	Satker IMO, Ditjen Perkeretaapian 2019	Rp/Km.day	Rp.202.000/Km.day for maintenance dan Rp.608.000/Km.day for railroad operational
4	The asset value of railway construction and improvement works after depreciation	SIMAK BMN Ditjen Perkeretaapian Tahun 2019 note : Asset value is basic to calculate depreciation of railroad infrastructure	Rp/Km.year	Rp.42.914.138.188,48/Km.year

AMOUNT OF UNIT COSTS FOR USE OF THE TRAIN INFRASTRUCTURE

Assets related to railway infrastructure are: Land, Buildings & Buildings (Railway Operational Stations & Buildings), Roads and Bridges, Networks (Operational Facilities), Irrigation. The total value of these assets is Rp. 241,793,703,643,663, -. Assuming the average technical life of the railway line is 50 years, the annual depreciation value is around 2% of the investment value for the construction of a new railway.

depreciation/day = % depreciation a year x ((Rp. Asset Prasarana ÷ Active Line Km Length) ÷ 365 days

$$\begin{aligned} \text{Nilai Depresiasi / hari} &= 2\% * ((241.793.703.643.663/5.634,36)/ 365 \text{ hari}) \\ &= 2\% * (\text{Rp } 42.914.138.188,48/ 365) \\ &= \text{Rp } 2.351.459,63 / \text{Km.hari} \end{aligned}$$

$$\begin{aligned} \text{Satuan Biaya Penggunaan} \\ \text{Prasarana KA} \\ \text{(Rp/GT.KM)} &= \frac{\text{Nilai Depresiasi} + \text{Rerata Biaya IM} + \text{Rerata Biaya IO}}{\text{Daya angkut maksimum jalan rel}} \end{aligned}$$

$$\begin{aligned} \text{Satuan Biaya Penggunaan} \\ \text{Prasarana KA} \\ \text{(Rp/GT.KM)} &= \frac{\text{Rp } 2.351.459,63 + \text{Rp. } 202.000 + \text{Rp } 608.000}{54.794,52 \text{ GrossTon}} \end{aligned}$$

So it is obtained a Unit cost for the use of railway infrastructure (for newly built railway lines) of : **Rp. 57,69 /GT.Km**

PRIORITY FACTORS FOR THE USE OF RAILWAY INFRASTRUCTURE (FP)

1. SCENARIO 1:

- KA Angkutan Perintis/ Kedinasan, $F_p = 0$
- KA Angkutan Penumpang Ekonomi, $F_p = 0,5$
- KA Angkutan Penumpang Komersial/ Non PSO, $F_p = 1$
- KA Angkutan Barang, $F_p = 0,75$

2. SCENARIO 2:

- KA Angkutan Perintis/ Kedinasan, $F_p = 1$
- KA Angkutan Penumpang Ekonomi, $F_p = 1$
- KA Angkutan Penumpang Komersial/ Non PSO, $F_p = 1$
- KA Angkutan Barang, $F_p = 1$

3. SCENARIO 3:

- KA Angkutan Perintis/ Kedinasan, $F_p = 0$
- KA Angkutan Penumpang Ekonomi, $F_p = 0$
- KA Angkutan Penumpang Komersial/ Non PSO, $F_p = 1$
- KA Angkutan Barang, $F_p = 1$

4. SCENARIO 4:

- KA Angkutan Perintis/ Kedinasan, $F_p = 0$
- KA Angkutan Penumpang Ekonomi, $F_p = 0$
- KA Angkutan Penumpang Komersial/ Non PSO, $F_p = 0,6$
- KA Angkutan Barang, $F_p = 1$

TAC VALUE IN THE WORKING AREA OF BTP, EAST JAVA

Daop	TAC Tahun 2018	IMO Tahun 2018	TAC Formula Litbang (Skenario 1)	TAC Formula Litbang (Skenario 2)	TAC Formula Litbang (Skenario 3)	TAC Formula Litbang (Skenario 4)
Daop 7	Rp. 47.234.176.333,77	Rp. 55.855.362.234	Rp. 70.446.408.535	Rp. 84.579.978.320	Rp. 59.775.705.805	Rp. 38.635.717.200
Rasio masing-masing skenario dengan TAC 2018			49,14%	79,07%	26,55%	-18,20%
Rasio masing-masing skenario dengan IMO 2018			26,12%	51,43%	7,02%	-30,83%
Daop 8	Rp. 94.792.345.426,33	Rp. 111.480.524.837	Rp. 170.279.226.950	Rp. 223.478.917.555	Rp. 192.488.952.810	Rp. 174.396.775.160
Rasio masing-masing skenario dengan TAC 2018			79,63%	135,76%	103,06%	83,98%
Rasio masing-masing skenario dengan IMO 2018			52,74%	100,46%	72,67%	56,44%
Daop 9	Rp. 40.386.382.180,37	Rp. 48.110.353.780	Rp. 28.176.011.480	Rp. 39.612.952.140	Rp. 22.015.842.240	Rp. 17.430.922.480
Rasio masing-masing skenario dengan TAC 2018			-30,23%	-1,92%	-45,49%	-56,84%
Rasio masing-masing skenario dengan IMO 2018			-41,43%	-17,66%	-54,24%	-63,77%
Total	Rp. 182.412.903.940,46	Rp. 215.446.240.851	Rp. 268.901.646.965	Rp. 347.671.848.015	Rp. 274.280.500.855	Rp. 230.463.414.840
Rasio masing-masing skenario dengan TAC 2018			47,41%	90,60%	50,36%	26,34%
Rasio masing-masing skenario dengan IMO 2018			24,81%	61,37%	27,31%	6,97%

POTENTIAL RATIO OF R & D FORMULA TAC WITH TAC 2018 WHOLE OPERATION DISTRICT

TAC 2018 (Rp)	TAC Skenario 1 (Rp)	TAC Skenario 2 (Rp)	TAC Skenario 3 (Rp)	TAC Skenario 4 (Rp)
902.206.838.845	1.942.355.230.445,79	2.657.998.229.546,22	1.578.186.409.675,40	1.228.091.188.469,27
Ratio	115,29%	194,61%	74,93%	36,12%

CONCLUSIONS

1. The current TAC formula is the calculation of IMO multiplied by F_p , where $F_p = 0.75$ so that TAC is only 75% of IMO.
2. Factors that influence the determination of the unit cost for the use of railway infrastructure include: Maximum railroad passing tonnage; Depreciation; Average Need for Maintenance (IM) and Operation (IO) of Railway Infrastructure; Asset value of construction work and improvement of railway lines after depreciation. Then the unit cost of using railway infrastructure (for newly built railway lines) is: Rp. 57.69 /GT.Km.
3. From the table of the TAC Potential ratio in the East Java BTP Work Area, it can be seen that the TAC for Research and Development from the four scenarios > TAC in 2018 (an increase of 26.34% to 90.60%) and TAC for Research and Development > IMO in 2018 (increased by 6.97% s / d 61.37%).
4. R & D formula with scenario 4 only the value of TAC throughout operation distric = Rp. 1,228,091,188,469.27 of the 2018 Total TAC of Rp. 902,206,838,845 an increase of 36.12%)

RECOMMENDATIONS

1. So that the Ministry of Transportation encourages the formation of BUPP in accordance with the mandate of Law 23/2007.
2. The TAC formulation still refers to Law Number 23 Year 2007 Article 154 and Government Regulation Number 61 Year 2016 Article 159.
3. The Ministry of Transportation to recalculate the investment value of railway infrastructure development / improvement beyond what is stipulated in PM 78/2014.
4. The existing TAC formula cannot measure an objective unit cost, so it is necessary to make a formula according to the calculation simulation of Potential each operational district in East Java using the formula ($TAC_{KA} = GT_{KA} \times KM_{KA} \times \text{Unit Cost of Use of Infrastructure} \times FP$).
5. The Ministry of Transportation conducts direct calculations (independently) of the Cross Capacity Analysis and production of railway transport (transportation tonnage and frequency of trips) with an automatic counting system with a technology to obtain the variable weight of trains passing in a traffic so that an objective and real time TAC nominal.

CALCULATION OF TAC AUTOMATICLY

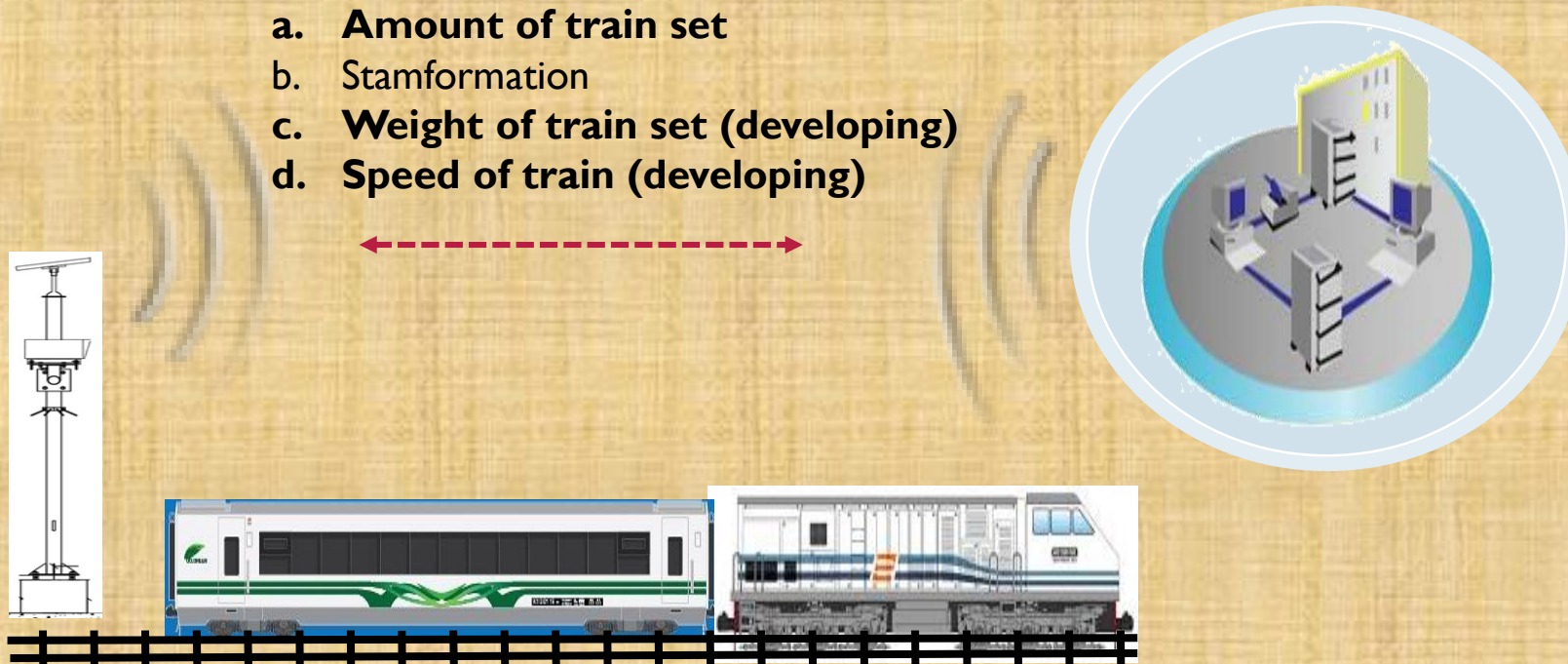
PROTOTYPE OF TAC COUNTER DEVICES

1. TAC measuring instrument, providing real-time information on the use of railway lines including: identification according to Gapeka, speed, number of circuits, and processing information into a fast and precise database system.
2. The results of data processing are used to determine the amount of TAC that must be paid by the train operator, besides being used for future infrastructure planning..

COLLECTING DATA:

- a. Amount of train set
- b. Stamformation
- c. Weight of train set (developing)
- d. Speed of train (developing)

OPERATION CONTROL CENTRE



THANK YOU



**RESEARCH AND DEVELOPMENT OF ROAD & RAILWAY TRANSPORTATION AGENCY
RESEARCH AND DEVELOPMENT
MoT REPUBLIC OF INDONESIA**