

FINAL ASSIGNMENT

DESIGN OF RAILWAY TRACK

FOR

JAKARTA - SURABAYA HIGH SPEED TRAIN

Submitted to complete one of the requirements in obtaining
The Bachelor Degree (S1) Engineering Faculty
Civil Engineering Department Sultan Agung Islamic University



BRYAN MALIK HUDA

30.2014.03.721

M. MISH BAAHUL MUNIR

30.2014.03.870

CIVIL ENGINEERING DEPARTMENT

ENGINEERING FACULTY

UNIVERSITAS ISLAM SULTAN AGUNG

SEMARANG

2018



YAYASAN BADAN WAKAF SULTAN AGUNG

UNIVERSITAS ISLAM SULTAN AGUNG (UNISSULA)
FAKULTAS TEKNIK

Jalan Raya Kaligawe KM. 4 Po. BOX 1054 Telp. (024) 6583584 Ext. 507 Semarang 50112

APPROVAL PAGE

FINAL ASSIGNMENT

“DESIGN OF RAILWAY TRACK
FOR
JAKARTA - SURABAYA HIGH SPEED TRAIN”

By :



BRYAN MALIK HUDA

30201403721



M. MISH BAAHUL MUNIR

30201403870

Have been approved on, September 4th, 2018

Supervisor

Ir. Gatot Rusbintardjo, M.R.Eng.MSc., Ph.D

Co - Supervisor

Ir. M. Faiqun Ni'am, MT., Ph.D

Approved,

Head of Civil Engineering Department, Engineering Faculty,
Universitas Islam Sultan Agung Semarang



Art Sentani, ST., M.Sc



**YAYASAN BADAN WAKAF SULTAN AGUNG
UNIVERSITAS ISLAM SULTAN AGUNG (UNISSULA)
FAKULTAS TEKNIK**

Jalan Raya Kaligawe KM. 4 Po. BOX 1054 Telp.(024)6583584 Ext.507 Semarang 50112

**BERITA ACARA BIMBINGAN TUGAS AKHIR
Nomor: 14 / A.2 / SA - T / III / 2018**

Pada hari ini, tanggal 12 Maret 2018 berdasarkan Surat Keputusan Ketua Jurusan Universitas Islam Sultan Agung (UNISSULA) Semarang perihal penunjukan Dosen Pembimbing Tugas Akhir:

1. Nama : Ir. Gatot Rusbintardjo, M.R.Eng.MSc., Ph.D
Jabatan Akademik : Lektor

dan

2. Nama : Ir. M. Faiqun Ni'am, MT., Ph.D
Jabatan Akademik : Lektor

dengan ini menyatakan bahwa mahasiswa yang tersebut dibawah ini:

1. Nama : Bryan Malik Huda
Nim : 30201403721
Jurusan : Teknik Sipil

2. Nama : M. Mish Baahul Munir
Nim : 30201403870
Jurusan : Teknik Sipil

telah menyelesaikan Tugas Akhir dengan Judul "Design of Railway Track for Jakarta - Surabaya High Speed Train". Adapun tahapan Tugas Akhir adalah sebagai berikut:

| No. | Tahapan | Tanggal |
|-----|-----------------------------|------------------------------|
| 1 | Penunjukan Dosen Pembimbing | 12 Maret 2018 |
| 2 | Pengajuan Judul TA | 9 April 2018 |
| 3 | Penelitian/Pengumpulan Data | 9 April -22 Mei 2018 |
| 4 | Penyusunan Laporan | 26 Mei 2018 – 9 Agustus 2018 |
| 5 | Selesai Laporan | 16 Agustus 2018 |
| 6 | Seminar Tugas Akhir | 28 Agustus 2018 |
| 7 | ACC Laporan Tugas Akhir | 4 September 2018 |

Demikian Berita Acara Bimbingan Tugas Akhir atau Skripsi ini dibuat untuk diketahui dan dipergunakan seperlunya oleh pihak – pihak yang berkepentingan.

Dosen Pembimbing I

Ir. Gatot Rusbintardjo, M.R.Eng MSc., Ph.D

Dosen Pembimbing II

Ir. M. Faiqun Ni'am, MT., Ph.D

Mengetahui,

Ketua Jurusan Teknik Sipil



Ari Sentani, ST., M.Sc

DECLARATION

The undersigned below :

Name : 1. Bryan Malik Huda (30201403721)
2. Muhammad Mish Baahul Munir (30201403870)

Department : Civil Engineering

Hereby declare this our Final Assignment is entitled : **DESIGN OF RAILWAY TRACK FOR JAKARTA – SURABAYA HIGH SPEED TRAIN** is a scholarly work free from plagiarism. If later there is proven plagiarism from this final assignment, then I am willing to accept sanction in accordance with applicable legislation.

Semarang, September 2018

By :

Editor I



Bryan Malik Huda

Editor II



Muhammad Mish Baahul Munir

Approved :

Supervisor

A blue ink signature is written in a cursive style.

Ir. Gatot Rusbintarjo, M.R.Eng.Sc., Ph.D

Co – Supervisor

A blue ink signature is written in a cursive style.

Ir. M. Faiqun Ni'am, MT., Ph.D

ACKNOWLEDGEMENTS

Alhamdulillahirabbil'alamin, upon *Ridho* and *Rahmat Allah Subhana Wa Ta'ala* this final assignment report with title “**Design of Jakarta-Surabaya High Speed Train Railway Track**” can be completed.

Drafting of final assignment is one of academic requirements for college students of civil engineering UNISSULA to reach bachelor degree. By this final assignment, the college student can increase their knowledge and can practice their science.

On this opportunity let the drafter to thank to everyone who have helped drafter by power, thinking, costs, and advice, That is :

1. My main study supervisor, Ir. H. Gatot Rusbintardjo, M.R.Eng MSc., Ph.D., who has taken the time to guide the writer in completing this essay, thanks you for for his encourages, guidance, criticism, and friendship. And I an also very thankful to my Co – supervisor, Ir. M. Faiqun Ni'am, MT., P.hD., for his guidance, advice and motivation. Without their continued support and interest, this final assignment report would not have been the same as presented here.
2. Dean of the Engineering Faculty of UNISSULA, Bapak Ir. H. Rahmat Mudiyono, M.T., Ph.D and Head of Department of Civil Engineering, Faculty of Engineering UNISSULA, Bapak Ari Sentani, ST., M.Sc., for permission, to take the final assignment as the requirement for reaching Bachelor Degree in Civil Engineering in Faculty of Engineering UNISSULA.
3. Mr. and Mrs. Dosen Faculty of Engineering who have provided their knowledge to the author. hopefully the knowledge that the author has obtained can be useful in the future.
4. My guardian lecturer, Ari Sentani, ST, M.Sc for four years guidance.
5. Special thanks to my parents Musyafa' and Istifaiyah, S.Pd,i. My sister and brother, Ruba'i, S.Q, S.Hi, Siti Miftahurrohmah, S.Si, Noor Yanto, Shohibul Fadhilah, S.Pd.i, Kholilur Rohman, S.Pd, And also the niece who loves me

Muhammad Husein Avicenna, Keyyisa Mayyaza Zannuba, Nadine Azizah, who always provide moral, material, and prayer support to me.

6. I also would like to thank to Bryan Malik Huda as my partner, for all that we have been through together and I hope that the future can work further and bless all in the future the knowledge we learn, work fast and get married quickly.
7. Thanks to my best friend “Kos Asmara”, Dirga Asmara P, Edo Fajar I, ST., Dory Pandu P.P, ST., Farhan Fakhry, Bangkit Wibowo, Oshada, Dedy, Yoga, and Mak Laundry, Who has supported and contributed thoughts in the preparation of this final assignment.
8. Thank you to my college friends of class 2014 for their good cooperation during four years studying in Engineering Faculty of Universitas Islam Sultan Agung.
9. Thank to Insyaallah my best friend, Fiqih Muthoharoh, who has given me passion and prayer in order to complete this final assignment on time.
10. Soto Pak Man and PK fried rice that always accompany the culinary night when hungry crash.
11. Thank to my Supporting friends, Hanik Mas Unah, S.Pd., Yuni Fatmawati, and friends “Sedulur Kingslef”, Bos Dayat, Bos Modin Asif, Yai Fuad, Yai Tomi, Mas Basith, Mas Mingai Banser, Mas Syarif, Mas Alex, Mas Chanafi, Mas Sahal, Mas Tas’an and Mas Hasib, Who has supported and contributed thoughts in the preparation of this final assignment.

Therefore I as a writer is hoping for suggestions and criticisms that can add to the perfection of this final assignment. finally, hopefully this final assignment will be useful for the readers in general and the University.

Semarang, September 2018

Muhammad Mish Baahul Munir

ACKNOWLEDGEMENTS

Alhamdulillahirabbil'alamin, upon *Ridho* and *Rahmat Allah Subhana Wa Ta'ala* this final assignment report with title “**Design of Jakarta-Surabaya High Speed Train Railway Track**” can be completed.

Drafting of final assignment is one of academic requirements for college students of civil engineering UNISSULA to reach bachelor degree. By this final assignment, the college student can increase their knowledge and can practice their science.

On this opportunity let the drafter to thank to everyone who have helped drafter by power, thinking, costs, and advice, That is :

1. Rector Universitas Islam Sultan Agung, Ir. H. Prabowo Setyawan, M.T., Ph.D which has given me the opportunity to learn and increase knowledge.
2. Dean of the Engineering Faculty of Universitas Islam Sultan Agung , Ir. H. Rahmat Mudiyo, M.T.,Ph.D. which has given me facilities and infrastructure.
3. In particular, I wish to express my sincere appreciation to my main final assignment supervisor, Ir. Gatot Rusbintardjo, M.R.Eng.Sc.,Ph.D., for his encourage, guidance, criticism, and friendship.
4. I am also very thankful to my co-supervisor Ir. M. Faiqun Ni'am, MT., Ph.D for his guidance, advice, criticism, and motivation.
5. Head of Civil Engineering Department, Engineering Faculty of Universitas Islam Sultan Agung, Ari Sentani, ST, M.Sc for permission, to take final assignment as the requirement for reaching bachelor degree.
6. My guardian lecturer, Prof. Dr. Ir. Antonius, MT. for four years guidance.
7. Special thanks to my parents Setyono and Tri Wahyuni, My brother, Fanino Jati Maulana , who always provide moral, material, and prayer support to me.
8. I also would like to thank to Muhammad Mish Baahul Munir as my partner, for all that we have been through together and I hope that the future can work further and bless all in the future the knowledge we learn, get work and get married quickly.

9. Thanks to my best friend in grup “Kost Asmara”, “Gelisah Aice” and “Doctorine” has supported and contributed thoughts in the preparation of this final assignment.
10. Thank you to my college friends of class 2014 for their good cooperation during four years studying in Engineering Faculty of Universitas Islam Sultan Agung.

Therefore I as a writer is hoping for suggestions and criticisms that can add to the perfection of this final assignment. finally, hopefully this final assignment will be useful for the readers in general and the University.

Semarang, September 2018

MOTTO

، إِنَّ صَلَاتِي وَنُسُكِي وَمَحْيَايَ وَمَمَاتِي لِلَّهِ رَبِّ الْعَالَمِينَ

162. Katakanlah: Sesungguhnya sembahyangku, ibadahku, hidupku dan matiku hanyalah untuk Allah, Tuhan semesta alam. (QS. Al-An'am: 162)

* قُلْ تَعَالَوْا أَتْلُ مَا حَرَّمَ رَبِّيَ عَلَيْكُمْ ۖ أَلَّا تُشْرِكُوا بِهِ شَيْئًا ۖ وَبِالْوَالِدَيْنِ إِحْسَانًا ۖ وَلَا تَقْتُلُوا أَوْلَادَكُمْ مِنْ إِمْلَاقٍ ۖ نَحْنُ نَرْزُقُكُمْ وَإِيَّاهُمْ ۖ وَلَا تَقْرَبُوا الْفَوَاحِشَ مَا ظَهَرَ مِنْهَا وَمَا بَطَّنَ ۖ وَلَا تَقْتُلُوا النَّفْسَ الَّتِي حَرَّمَ اللَّهُ إِلَّا بِالْحَقِّ ذَٰلِكُمْ وَصَّاكُمْ بِهِ لَعَلَّكُمْ تَتَّقُونَ

“Katakanlah! ‘Marilah kubacakan apa yang diharamkan atas kamu oleh Tuhanmu, yaitu; ‘Janganlah mempersekutukan sesuatu dengan Dia, berbuat baiklah kepada kedua orang tua (Ibu bapak), janganlah kamu membunuh anak-anak kamu karena takut miskin. Kami akan rizqi padamu dan pada mereka;- dan janganlah mendekati perbuatan-perbuatan yang keji, baik yang nampak diantaranya maupun yang tersembunyi, dan janganlah kamu membunuh jiwa yang diharamkan Allah (membunuhnya) melainkan dengan sesuatu (sebab) yang benar. Demikian itu yang diperintahkan oleh Tuhanmu. Supaya kamu memahaminya. (QS. Al-An'am (5): 151)




“Barangsiapa yang menuntut ilmu yang sebenarnya harus ditujukan hanya untuk mengharap wajah Allah, namun ia mempelajarinya hanya untuk mendapatkan materi duniawi, maka ia tidak akan pernah mencium bau surga pada hari kiamat nanti” (HR. Abu Daud no. 3644 dan Ibnu Majah no. 252, dishahihkan oleh Al Albani)

"Harga kebaikan manusia adalah diukur menurut apa yang telah dilaksanakan atau diperbuatnya." (Ali Bin Abi Thalib)


“Sesuatu yang belum dikerjakan, seringkali tampak mustahil, kita baru yakin kalau kita telah berhasil melakukannya dengan baik.” (Evelyn Underhill)

Muhammad Mish baahul Munir


MOTTO

1.  وَإِلَىٰ رَبِّكَ فَارْغَب  فَإِذَا فَرَغْتَ فَانصَب  إِنَّ مَعَ الْعُسْرِ يُسْرًا

Maka sesungguhnya bersama kesulitan ada kemudahan. Sesungguhnya bersama kesulitan ada kemudahan. Maka apabila engkau telah selesai (dari sesuatu urusan), tetaplah bekerja keras (untuk urusan yang lain). Dan hanya kepada Tuhanmulah engkau berharap. (QS. Al-Insyirah,6-8)

2.  اللَّهُ أَنَّهُ لَا يَأْتِسُّ مِنْ رَوْحِ اللَّهِ إِلَّا الْقَوْمُ الْكَافِرُونَ

Dan janganlah kamu berputus asa dari rahmat Allah. Sesungguhnya tiada berputus asa dari rahmat Allah melainkan orang-orang yang kafur (terhadap karunia Allah). (QS. Yusuf, 87)

3. وَلَا تَهِنُوا وَلَا تَحْزَنُوا وَأَنْتُمْ الْأَعْلَوْنَ إِنْ كُنْتُمْ مُؤْمِنِينَ 

Janganlah kamu bersikap lemah, dan janganlah (pula) kamu bersedih hati, padahal kamulah orang-orang yang paling tinggi (derajatnya), jika kamu orang-orang yang beriman. (QS. Ali 'Imran, 139)

DEDICATION

I dedicated this final assignment to the knowledge of civil engineering in general and railway engineering in particular as my worship to Allah Subhana Wa Ta'ala