UNIVERSITY OF MUMBAI

ACADEMIC YEAR 2019-2020

A PROJECT REPORT

ON

"SEMI AUTOMATIC PIPE SCRAPING AND CLEANING MECHANISM USING COMPRESSED AIR"

Submitted by

KADU ADNAN

SHAIKH SHABBIR

KOYA IRFAN

SAYED ILYAS

In partial fulfillment for the award of the Degree

Of

BACHELOR OF ENGINEERING

IN

MECHANICAL ENGINEERING

UNDER THE GUIDANCE

Of

PROF. JAVED KAZI

DEPARTMENT OF MECHANICAL ENGINEERING

ANJUMAN-I-ISLAM

KALSEKAR TECHNICAL CAMPUS NEW PANVEL,

NAVI MUMBAI – 410206

INTERNAL EXAMINER
(PROF.JAVED KAZI)

I/C HOD
(PROF. ZAKIR ANSARI)

ANJUMAN-I-ISLAM

KALSEKAR TECHNICAL CAMPUS NEW PANVEL

(Approved by AICTE, recg. By Maharashtra Govt. DTE,

Affiliated to Mumbai University)

PLOT #2&3, SECTOR 16, NEAR THANA NAKA, KHANDAGAON, NEW PANVEL,NAVI MUMBAI-410206, Tel.: +91 22 27481247/48 * Website: www.aiktc.org

CERTIFICATE

This is to certify that the project entitled

" SEMI AUTOMATIC PIPE SCRAPING AND CLEANING MECHANISM USING COMPRESSED AIR"

Submitted by

KADU ADNAN

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SAYED ILYAS

To the Kalsekar Technical Campus, New Panvel is a record of bonafide work carried out by him under our supervision and guidance, for partial fulfillment of the requirements for the award of the Degree of Bachelor of Engineering in Mechanical Engineering as prescribed by **University of Mumbai**, is approved.

Internal Examiner **External Examiner**

(Prof. JAVED KAZI) (Prof.____)

Head of Department **Principal**

(Prof. ZAKIR ANSARI) (Dr. Abdul Razzak Honnutagi)

ANJUMAN-I-ISLAM

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APPROVAL OF DISSERTATION

This is to certify that the thesis entitled

"SEMI AUTOMATIC PIPE SCRAPING AND CLEANING MECHANISM USING COMPRESSED AIR"

Submitted by

KADU ADNAN

SHAIKH SHABBIR

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SAYED ILYAS

In partial fulfillment of the requirements for the award of the Degree of Bachelor of Engineering in Mechanical Engineering, as prescribed by University of Mumbai approved.

(Internal Examiner) **(External Examiner)**

_____ _____

Date: _____

Declaration

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

---------- (Signature) ----------

-------(Name of student and Roll No.)

Date:

ACKNOWLEDGEMENT

After the completion of this work, we would like to give our sincere thanks to all those who helped us to reach our goal. It's a great pleasure and moment of immense satisfaction for us to express my profound gratitude to our guide **Prof. JAVED KAZI** whose constant encouragement enabled us to work enthusiastically. His perpetual motivation, patience **a**nd excellent expertise in discussion during progress of the project work have benefited us to an extent, which is beyond expression.

We would also like to give our sincere thanks to **Prof. Zakir Ansari**, Head of Department; **Prof. Rahul Thavai and Prof. Rizwan Shaikh**, Project coordinator from Department of Mechanical Engineering, Kalsekar Technical Campus, New Panvel, for their guidance, encouragement and support during a project.

First of all, I would like to thank **Mr. RUSHI LAL (CWM), Mr. SUBHESH VARMA (TRAINING OFFICER)** for giving us an opportunity to take training in this historical workshop.

I express my heartily gratitude to **Mr. SANJAY MAHAJAN (CL, BTC), Mr. M.A. QADRI (INST., BTC)** for their unstinting support and suggestion which gave us direction to work.

We take this opportunity to give sincere thanks to **Mr. M.A. QADRI (INST., BTC)**in "Indian railways, Matunga Carriage Workshop." for all the help rendered during the course of thiswork and there. Support, motivation, guidance and appreciation.

We must thank **BTC department of Indian Railways Carriage Workshop Matunga, Mumbai** for providing the opportunity to express my gratitude to all the individuals whose contribution have helped us in undergoing training and successful completion of my project at Carriage Workshop, Central Railway, Matunga, Mumbai-400019.

We are thankful to **Dr. Abdul Razzak Honnutagi**, Kalsekar Technical Campus New Panvel, for providing an outstanding academic environment, also for providing the adequate facilities.

Without the support, assistance, and motivation provided by those around us, this study would have never been accomplished.

Special thanks to **Prof. JAVED KAZI (INTERNAL GUIDE), Prof. ZAKIR ANSARI (HOD MECH).**

I would also like to thank all Workshop Officials, Shop Superintendents, Staff members and faculty members for their valuable help at the time.

Last but not the least; I would like to thank all my colleagues and workers for all the cooperation and for their direct or indirect help during the phase of my training.

Last but not the least we would also like to thank all the staffs of Kalsekar Technical Campus (Mechanical Engineering Department) for their valuable guidance with their interest and valuable suggestions brightened us.

SINCERE THANKS FROM,

KADU ADNAN

SHAIKH SHABBIR

KOYA IRFAN

SAYED ILYAS

ANJUMAN-I-ISLAM'S
KALSEKAR TECHNICAL CAMPUS, NEW PANVEL
Approved by : All India Council for Technical Education, Council of Architecture, Pharmacy Council of India New Delhi, Recognised by : Directorate of Technical Education, Govt. of Maharashtra, Affiliated to : University of Mumbai.

☑ SCHOOL OF ENGINEERING & TECHNOLOGY
☐ SCHOOL OF PHARMACY
☐ SCHOOL OF ARCHITECTURE

DEPARTMENT OF MECHANICAL ENGINEERING

REV: 00	**PERMISSION FROM INDUSTRY FOR TRAINING**	IIC-16

APLE Date: 23/09/19

To,
Central Railway Carriage Workshop, Matunga
Mumbai.

Presently we are providing project training of 1 year in which student visit once in a week. These students have time contained of 6 months.
Permission for 6 month project training may be given in which studen will visit once in a week.

Permitted once in a month along with instructor

24.9.19

23.9.19 CS/IBT

Sub: Permission for Final year Industrial Project

Dear Sir / Madam,
Greetings from Kalsekar Technical Campus, Navi Mumbai!
We introduce ourselves as a premier technical institute recognized by AICTE offering Under Graduate and Post Graduate courses affiliated to Mumbai University, having talented and qualified pool of faculties and excellent infrastructure..
We offer Full time Engineering UG Degree (Bachelor of Engineering) courses affiliated to Mumbai University, approved by AICTE, New Delhi and DTE.

1) Civil Engineering
2) Computer Engineering
3) Electrical Engineering
4) Electronics and Telecommunication Engineering
5) Mechanical Engineering.

Full Time Pharmacy Degree Course. :- Bachelor of Pharmacy (B-Pharm)
Full time Architectural Degree course :- B-Arch
Full time PG Degree Courses (Master of Engineering) :- M.E. (Construction Engg & Management)
You are requested to kindly allow following students to work in your reputed organization. We assure that our students will abide by all rules and regulations defined by organization.

Student Name	Kadu Adnan M Saeed	Koya Mohd Irfan	Shaikh Shabbir Nawshad	Sayed Mohammed Ilyas
Mobile No	8976267701	8898387012	7208825242	7977651627
Class & Branch	BE-ME-2 Mechanical Eng Dept	BE-ME-2 Mechanical Eng Dept	BE-ME-2 Mechanical Eng Dept	BE-ME-2 Mechanical Eng Dept

Please feel free to contact the undersigned for any query. Looking forward to long term association with you. Thanking you,
Best Regards

Name and sign Project Guide
8097171732

Name and sign of TPO

मध्य रेल

बुनियादी प्रशिक्षण केंद्र(यांत्रिक)
सवारी डिब्बा कारखाना, माटुंगा,
मुंबई - 400019.

संख्या-बी.टी.सी./माटुंगा/ग्रेज्यूएट अप्रेंटिस/10

दिनांक:- 28.09.2019

The Principal,
Anjuman-I-Islam's
KALSEKAR TECHNICAL CAMPUS, NEW PANVEL

Sub: Permission for Project Training.
Ref: Your College Letter dated 23.09.2019

With reference to above, this is to inform you that, the under mentioned student of your College has been granted permission to undertake Project Training from 30.09.2019 to 31.03.2020 once in a month along with College Instructor/ College Co-ordinator in Matunga Workshop, on usual terms and conditions which are enclosed herewith in Annexure 'A'.

S.No.	Name
1	ADNAN M. SAEED KADU
2	MOHAMMAD IRFAN KOYA
3	SHABBIR NAWSHAD SHAIKH
4	SAYED MOHAMMAD ILYAS

The terms and conditions mentioned in Annexure' A' are required to be accepted in writing before commencement of training.

DA: Annexure' A'

28.9.19

Mahesh Degaonkar
Training Officer,
AWM(M)/MTN
For Chief Workshop Manager,
Matunga, Mumbai-19.

ABSTRACT

This project on the SEMI AUTOMATIC PIPE SCRAPING AND CLEANING MECHANISM USING COMPRESSED AIR was carried out at the Matunga Railway Carriage Workshop. The purpose of the project is to reduce the workforce in process of cleaning and scraping of brake pipes. This will also ensure lower maintenance cost and reduces time taken for the cleaning process. In the process of POH the pipes has been cleaned with a long process so that all the rust , dirt and paint on the pipe is removed. The process of cleaning the pipes require a gang of 5 to 6 workers..

Table of Content

ABOUT

INDIAN

RAILWAYS

Introduction to Indian Railway

Indian railways (IR) is the stated owned railway company of India Indian railway has a monopoly on the country's rail transport. It is also one of the largest and busiest rail networks in the world, transporting under 5 billion passengers and almost 650 million of freight actually.

IR is the world's largest commercial or utility employer, with more than 16 million employees.

The railway traverse through the length and width of the country, the routes cover a total length of 63,940km (39,230miles). As of 2005 IR owns a total 216,717wagons &7,339 & coaches & above and 7,339 & above locomotives and run a total of 14,244, trains & above daily, including about 8,002 passengers trains & above.

Railways were first introduced to India in1853. By 1947, the year of India's independence, there were forty-two rail systems. In 1951 the system was nationalized as one unit, becoming one of the largest network in the world. Indian railway operates both long distance and the suburban rail systems,

A commemorative postage stamp issued by the Indian postal service celebrated 100 year of the Indian railway in 1953

Indian Railways	
Headquarters	New Delhi
Railway Minister	Piyush Goyal
Network	67,368 km(route) 93902km(running track) 121407km(total track)
Foundation	1845-present
Track gauges	Broad meter, narrow
Revenue	INR 467.85 billion
Chairman Railway Board	Ashwani Lohani

Figure: About Indian Railways

A plan for a rail system in India was first put forward in1832, but no further steps were taken for more than a decade. In 1844, the governor- general of India. Lord Hardinge allowed private entrepreneurs to set up a rail system in India. two new railway companies were created and the east India Company was asked to assist them. Interest from investors in the UK led to the rapid creation of a rail system over the few next years. The first train in India becomes operation on 1852-12-22 and used for the hauling of construction material in rookie. A year and a half later, on 1853-0.4-16, the first passenger train service was inaugurated between Boribunder Bombay and Thana. Covering a distance of 34km (21miles), it formally heralded the birth of railways in India.

The British government encouraged new railway companies backed by private investors under a scheme that would guarantee an annual return of five percent during the initial year of operation. Once established, the company would be transferred to the government, with the original company retaining operational control. The route mileage of this network was about 14,500km (9,000) miles by 1880, mostly radiating inward from the three major cities of Bombay, madras and Calcutta .by 1895, India had started its own locomotives and in 1896 sends engineers and locomotives to help build the Uganda railway.

Soon various independent kingdoms built their own rail system and the network spread to the region that becomes the modern day states of Assam, Rajasthan and Andhra Pradesh. A railway board operated under aegis of the department of commerce and industry and had time in its history; the railways began to make a tidy profit. In 1907, almost all the rail companies were taken over by the government.

The following year, the first electric locomotive appeared. With the arrival of the First World War, the railway was used to meet the needs of the British outside India. By the end of the First World War, the railways had suffered immensely and were in a poor state. The government took over the management of the railways and removed the link between the financing of the railways and other government revenues in 1920, a practice that continue to date with a separate railway budget.

	Name	Abbr.	Headquarters	Divisions
1	Central Railway	CR	Mumbai	Bhusawal, Nagpur, Mumbai (CST), Solapur, Pune
2	Eastern Railway	ER	Kolkata	Malda, Howrah, Sealdah, Asansol
3	East Central Railway	ECR	Patna	Danapur, Dhanbad, Sonepur, Mughalasarai, Samastipur
4	East Coast Railway	ECOR	Bhubaneswar	Khurda road, Waltair, Sambalpur
5	Northern Railway	NR	New Delhi	Ambala, Ferozpur, Lucknow, Moradabad, New Delhi

6	North Central railway	NCR	Allahabad	Allahabad, Jhansi, Agra
7	North Western Railway	NWR	Jaipur	Bikaner, Jodhpur, Jaipur, Ajmer
8	North Eastern Railway	NER	Gorakhpur	Lucknow, Varanasi, Izatnagar
9	Northeast Frontier Railway	NFR	Maligaon(Guwahati)	Katihar, Lumding, Tinsukhia, Alipurduar, Rangiya
10	Southern Railway	SR	Chennai	Chennai, Madurai, Palghat,
11	South Central Railway	SCR	Secunderabad	Secunderabad, Hyderabad, Guntakal, Vijayawada Guntur, Nanded
12	South Eastern Railway	SER	Kolkata	Kharagpur, Chakradharpur Adra, Ranchi
13	South East Central Railway	SECR	Bilaspur	Nagpur, Bilaspur, Raipur
14	South Western Railway	SWR	Hubli	Bangalore, Mysore, Hubli
15	Western Railway	WR	Mumbai	Bhavnagar, Mumbai Cental, Ratlam, Rajkot, Vadodara, Ahemadabad
16	West Central Railwasy	WCR	Jabalpur	Jabalpur, Bhopal, Kota.
17	Metro Railway	MTP	Kolkata	
18	Konkan Railway	KR	Navi Mumbai	

Table: Zonal details

Introduction of Matunga Railway

The Carriage Workshop, Matunga was set up in 1915 as a repair workshop for broad gauge and narrow gauge coaches and wagons of the erstwhile Great Indian Peninsular (GIP) Railway. The workshop covers a triangular piece of land/area of 35 hectares, including a covered area of about 11 hectares, skirted by the Central Railway suburban corridors on the east and the Western Railway corridors on the west.

The workshop now carries out Periodical Overhaul (POH) and heavy corrosion repairs of main line as well as EMU coaches. Last year i.e. in 2009-10, a total of 3182 coaches consisting of 2207 Non AC, 341 AC coaches and 634 EMU coaches were attended. For the year 2010-11 target is 1884 Non AC, 360AC and 720 EMU coaches.

The workshop is certified with ISO 9001/2000 and ISO 14001/1996 since 2001 & 2002 respectively. It was last recertified for ISO 9001-2000 in 2007 & ISO 1400-2004 in 2008.

Now this workshop is going one step ahead to adopt Integrated Management System covering ISO: 9000, ISO: 14000 & ISO: 18000 (Occupational Health and Safety Assessment Series). The system is likely to be implemented by July 2011.

Figure: Matunga railway station

Matunga: Mumbai's First "All-Women" Railway Station Enters Limca Book

Matunga station chugs into record book for being India's 1st all-women staffed station

Carriage Workshop, Central Railway, Matunga

The Carriage Workshop, Matunga was set up in 1915 as the repair workshop for broad gauge and narrow gauge coaches and wagons of the erstwhile Great Indian Peninsula (GIP) Railway. The covers the triangular piece of the land/area of 35 hector, including a covered area of about
11 hectares, skirted by the Central Railway Suburban Corridors on the east and Western Railway corridors on the west. The strength of the employee is not more than 8200 approx. The total no. of section is about 33 including 07 no. of electrical. The total no. of the machinery plant is about 1161. The consumption of electricity is about 6,00,000 unit per month.

Main activities for the year 2017-18

ACTIVITIES	TARGET(Per Month)
POH of Mail/Express/Passenger Coaches	203 Coaches per month including 33 AC coaches per month
POH of EMU Coaches	68 Coaches per month
Total No. of Coaches	271 Coaches per month

Table: Main activities 2016-17

A Few Firsts of Matunga Workshop

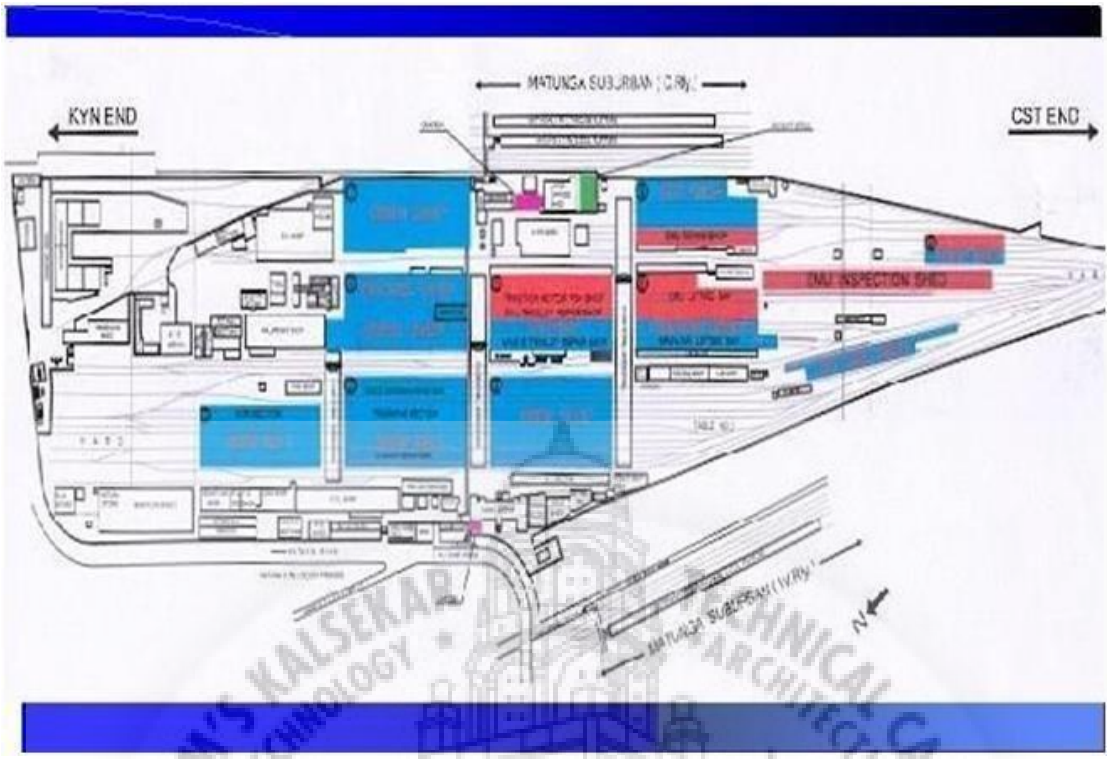
Retro fitment of flooring in lavatories of passenger with non-toxic in-situ floor:

In order to improve cleanliness and hygiene of the toilets in coaches. Epoxy flooring is being provided. Matunga is the first Zonal workshop on the Indian Railway to start Epoxy flooring in the toilets on a programmed basis since September 2010.

Provision of cushioned seats in all gs/slr coaches during poh has been carried out:

First Zonal workshop on Indian Railways to start cushioning in unreserved coaches from October 2008.

- First Zonal Workshop on Indian Railways to provide all coaches with Bogie mounted Air Brake System by the end of Jan 2011. The bogie mounted brake system is not only more reliable but also gives faster braking and release of brakes thus making the trains faster.
- First workshop to implement payment to contractors and suppliers through NEFT from 15th July 2010.
- First Zonal Workshop on Indian Railways to start cleaning of bogies by Grit Blasting in 2004. This has improved the safety standards of Rolling stock by enabling better examination.
- This workshop is awarded by ISO 9001:2004 as well as ISO 14001:1996 in 2001 & 2002 respectively.
- IMS (Integrated Management System) Certification in 2015.
- IMS, ISO 50001, ISO 3834, 5S and GreenCo.



Matunga Workshop Layout

❖ Notable Accomplishments:

- Coaches for Heritage Special.
- Lifeline Express.
- Deccan Odyssey. Retro fitment of DC to AC/DC EMU (Siemens).

❖ Innovations by Matunga Workshop:

- Headstock Manipulator and Fixture.
- Gravity Conveyor System.
- Motorized Bearing and Axle Box Extraction System.
- Roof Leakage Testing by sprinkling water on the Roof.
- BSS/Brake Block Hanger Testing and Painting Integrated Workstations.
- Provision of Venturi type Ventilators and Relocating body side windows of kitchen area.
- Provisions of Model Room for ERRU training.
- Commissioning Variable Voltage Variable Frequency Drive on alternator testing beds.
- Regular Training of Matunga Staff at Basic Training Center.
- Safety.

❖ Processes Involved in Carriage Repair Workshop:

POH (Periodic Overhaul) - 18 days process

Steps for POH:

1. Receiving the coach from yard:The coach to be repaired is received from the yard. 1 car means 8 coaches

2. Shunting of coach: Each coach to be separated into two parts:

A. Shell
B. Trolley

3. Pre-inspection and cleaning under frame as well as water tank attention:

Parts to be repair are and the under frame along with water tank are also cleaned.

4. Unloading of mechanical and electrical component:

All the components which function on electrical and mechanical energy are unloaded.
e.g.: Fans, seat, trolley, battery, doors, etc. These components are removed in order to reduce the weight of coach as well as for their repair and maintenance work.

5. Lifting of coach:

The coach is lifted at a higher position by using a lifting crane and is separated from trolley.

6. Trolley will be sent to trolley shop:

The parts of the trolley are further sub-divider into 3 sections:

A. Wheel to and fro wheel shop: Here the wheel is repaired by first checking its diameter which should not be less than 830mm.

B. Springs to and fro smithy shop: Here the springs are inspected having any cracks, abrasion, and corrosion. If the cracks are invisible to naked eye then bosh cleaning tank is used. It there are any cracks in the spring then the spring is thrown away and a new spring is used.

C. TR/ML (Trolley/Main Line) repair shop: All the other bogey components are sent to this shop for repairing.

7. A newly repaired bogey is obtained

8. Lowering the coach:

Here all the repaired parts of the coach are assembled together and the coach is lowered and assembled with the bogey.

9. Painting:

10. Layers of various paints are applied to the coach. Anti-corrosive paints are used.

This process requires 9 days.

11. Interior furnishing: This step includes furnishing of interior coach which includes seats, walkthrough etc.

12. Loading and unloading of mechanical components: In this step all the electrical and mechanical components which were unloaded earlier are loaded back to their original place after their testing and maintenance.

13. Air brake testing:

Air brake testing is done which is the most important part of this POH. It is a 1-day process. Twin pipe graduated air brake system is used.

14. Final inspection by NTEX (neutral train examiner):

The organizing committee is NCO (Neutral Control Organizing). NTRX will always do the final inspection of the newly obtained coach.

15. Dispatch to traffic:

After its final inspection the train is dispatch for its use.

CHAPTER 1

INTRODUCTION

Introduction

In railway with the headway of innovations, the security issues that are associated with railway thought of one amongst such a things is railway air brake system. The air brake is the standard train brake used by railways all over the world. Braking systems are tested to ensure that there are no leakages. As some components like brake, feed pipe, A9 valve and PR valve are used for high precision application they should be in top – class condition for them to be used. The Air Brake System must be thoroughly cleaned to check if there is any damage or leak on the pipe or the components. If there is any leakage the pipe is considered not to be fit for use and is replaced. Otherwise, the brake would be applied and the train will not move forward as the pressure of air decreases due to the leakage. This cleaning method ensures that does not happen.

CLASSIFICATION OF AIR BRAKE SYSTEM

On the basis of type of release, air brake system is classified as:

- Direct release air brake system
- Graduated release air brake system

Both Direct and Graduated release are further available in two forms viz.

- Single pipe and
- Twin pipe

On the basis of fitment, air brake system is classified as:

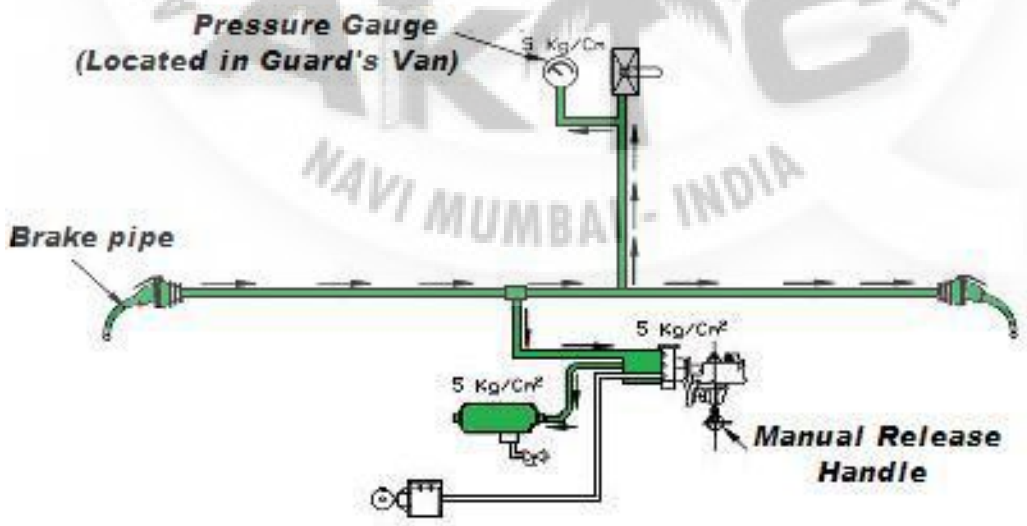
- Under frame mounted air brake system
- Bogie mounted air brake system

SINGLE PIPE GRADUATED RELEASE AIR BRAKE SYSTEM

Some of the Air Brake goods stock on IR is fitted with single pipe graduated release air brake system. In single pipe, brake pipes of all wagons are connected. Also all the cut off angle cocks are kept open except the front cut off angle cocks of BP of leading loco and rear end cut off angle cock of BP of last vehicle. Isolating cocks on all wagons are also kept in open condition. Auxiliary reservoir is charged through distributor valve at 5.0 kg/cm2.

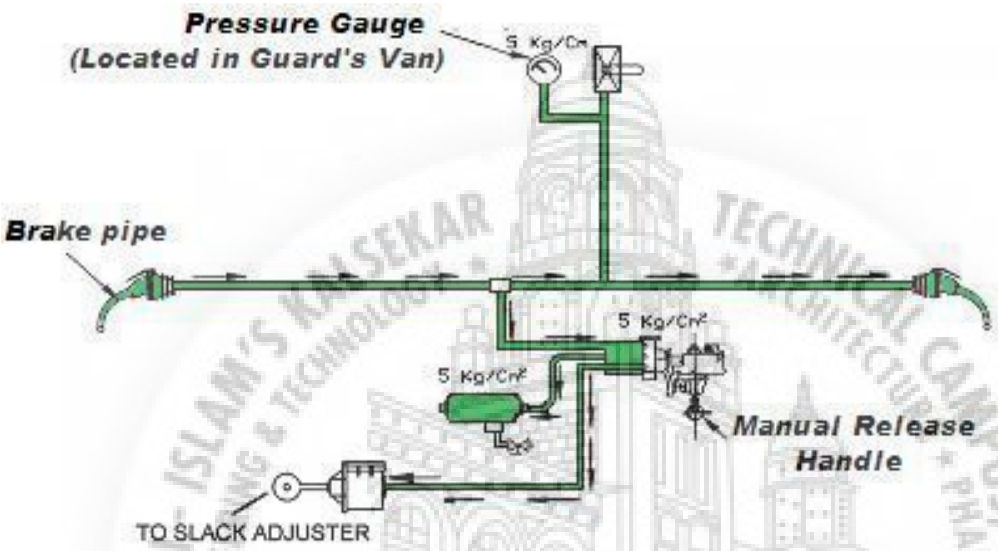
A. Charging stage

During this stage, brake pipe is charged to 5kg/cm2 pressure which in turn charges control reservoir and auxiliary reservoir to 5 kg/cm2 pressure via distributor valve. At this stage, brake cylinder gets vented to atmosphere through passage in Distributor valve.



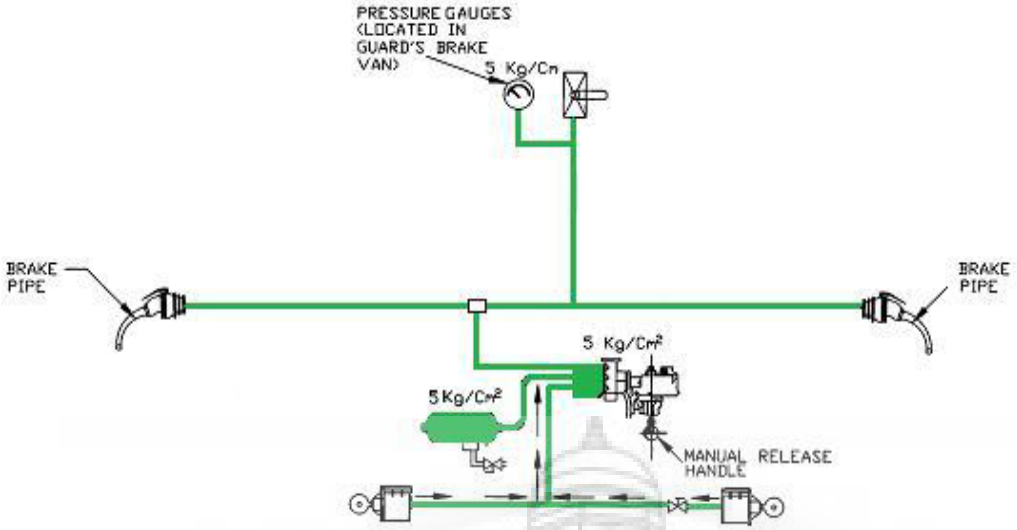
B. Application Stage

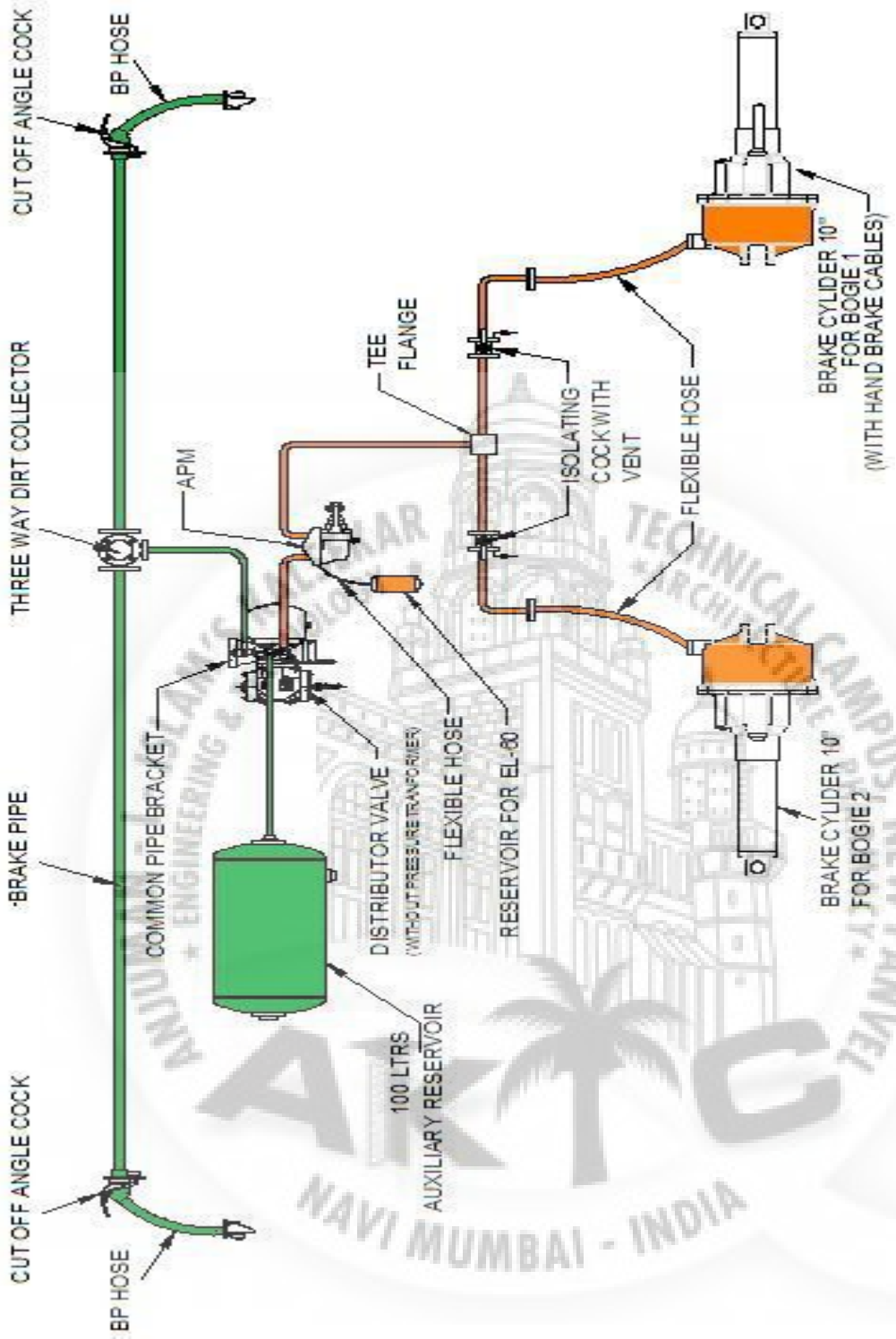
For application of brakes, the pressure in brake pipe has to be dropped. This is done by venting air from drivers brake valve. Reduction in brake pipe pressure positions the distributor valve in such a way that the control reservoir gets disconnected from brake pipe and auxiliary reservoir gets connected to brake cylinder. This results in increase in air pressure in brake cylinder resulting in application of brakes. The magnitude of braking force is proportional to reduction in brake pipe pressure.



C) Release stage

For releasing brakes, the brake pipe is again charged to 5 kg/cm2 pressure by compressor through driver"s brake valve. This action positions distributor valve in such a way that auxiliary reservoir gets isolated from brake cylinder and brake cylinder is vented to atmosphere through distributor valve and thus brakes are released.


PRESSURE GAUGES
(LOCATED IN
GUARD'S BRAKE
VAN)
5 Kg/Cm
BRAKE
PIPE
BRAKE
PIPE
5 Kg/Cm²
5 Kg/Cm²
MANUAL RELEASE
HANDLE



TWIN PIPE GRADUATED RELEASE AIR BRAKE SYSTEM

Some of the Air Brake goods stock is fitted with Twin pipe graduated release air brake system. In Twin pipe, brake pipes and feed pipes of all wagons are connected. Also all the cut off angle cocks are kept open except the front cut off angle cocks of BP/ FP of leading loco and rear end cut off angle cock of BP and FP of last vehicle. Isolating cocks on all wagons are also kept in open condition. Auxiliary reservoir is charged to 6.0 Kg/cm2 through the feed pipe.

A. Charging stage

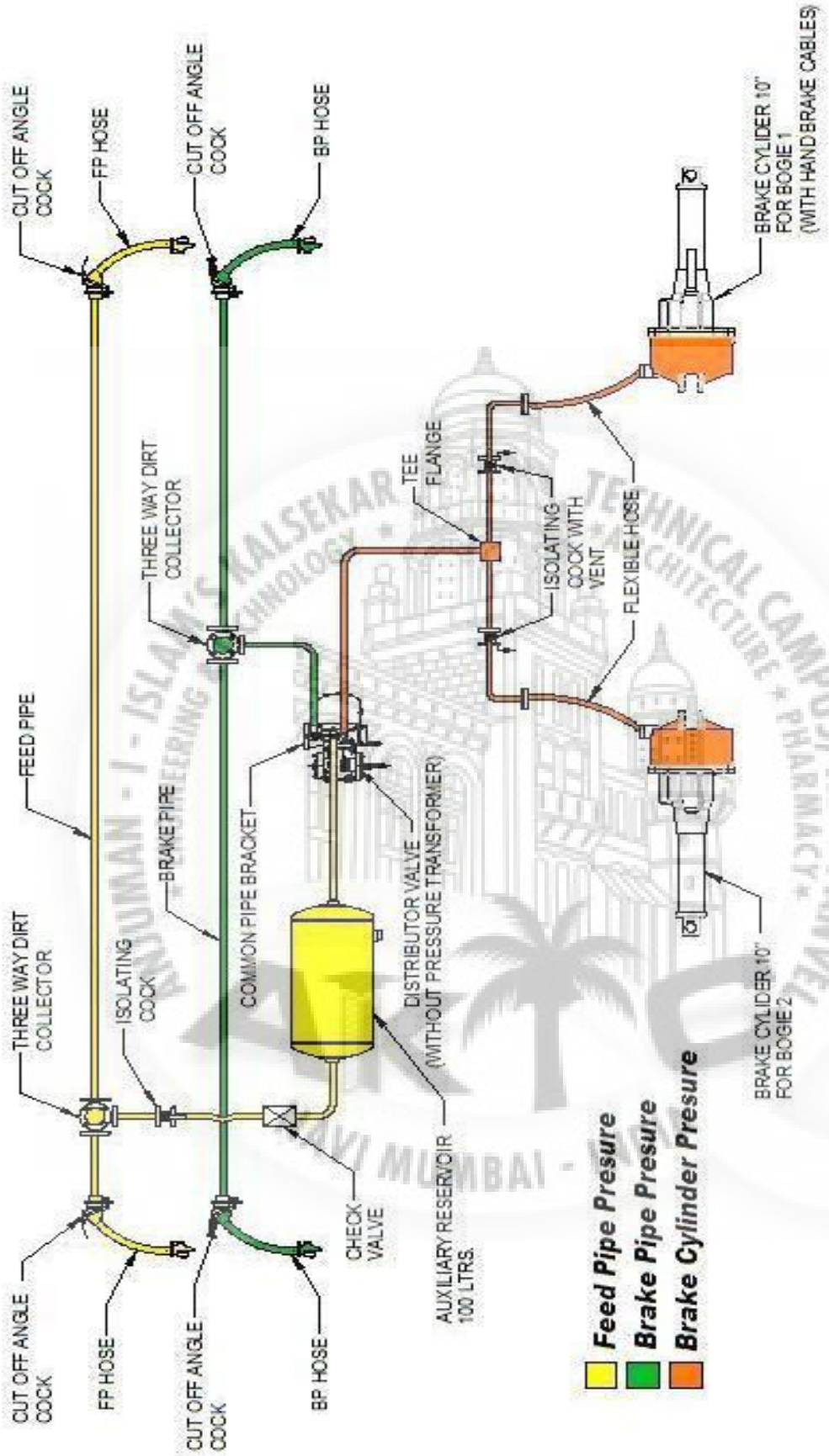
During this stage, brake pipe is charged to 5 kg/cm2 pressure and feed pipe is charged to 6 kg/cm2 pressure which in turn charges control reservoir and auxiliary reservoir to 6 kg/cm2 pressure. At this stage, brake cylinder gets vented to atmosphere through passage in Distributor valve.

B. Application Stage

For application of brakes, the pressure in brake pipe has to be dropped. This is done by venting air from driver‟s brake valve. Reduction in brake pipe pressure positions the distributor valve in such a way that the control reservoir gets disconnected from brake pipe and auxiliary reservoir gets connected to brake cylinder. This results in increase in air pressure in brake cylinder resulting in application of brakes. The magnitude of braking force is proportional to reduction in brake pipe pressure

C. Release stage

For releasing brakes, the brake pipe is again charged to 5 kg/cm2 pressure by compressor through driver‟s brake valve. This action positions distributor valve in such a way that auxiliary reservoir gets isolated from brake cylinder and brake cylinder is vented to atmosphere through distributor valve and thus brakes are released.


CUT OFF ANGLE COCK
FP HOSE
CUT OFF ANGLE COCK
BP HOSE
BRAKE CYLIDER 10" FOR BOGIE 1 (WITH HAND BRAKE CABLES)
TEE FLANGE
ISOLATING COCK WITH VENT
FLEXIBLE HOSE
THREE WAY DIRT COLLECTOR
FEED PIPE
BRAKE PIPE
COMMON PIPE BRACKET
DISTRIBUTOR VALVE (WITHOUT PRESSURE TRANSFORMER)
THREE WAY DIRT COLLECTOR
ISOLATING COCK
CHECK VALVE
AUXILIARY RESERVOIR 100 LTRS.
BRAKE CYLIDER 10" FOR BOGIE 2
CUT OFF ANGLE COCK
FP HOSE
CUT OFF ANGLE COCK
BP HOSE
Feed Pipe Presure
Brake Pipe Presure
Brake Cylinder Presure

Do"s and Don"ts for Twin Pipe working of Freight Trains

Do"s

1. Do ensure that the all twin pipe Wagons are operated in CC rakes only.

2. Do ensure that loco provided for twin pipe rake is having its twin pipe in working condition.

3. Do ensure availability of spare pool of twin pipe wagon & brake van, for replacement, if required.

4. Do ensure availability of spare feed pipe in loco.

5. Do ensure that brake van provided for twin pipe working is having twin pipe system

6. Do ensure BP coupling heads are marked with „BP" and painted in green.

7. Do ensure FP coupling heads are marked with „FP" and painted in white.

8. Do ensure that BP & FP hose couplings at the rear end of the train are placed on their respective hose coupling supports.

9. Do ensure that pressure gauges for BP and FP are provided in the brake van.

10. Do ensure that brake pipe/feed pipe angle cocks are not closed under any circumstance, either for isolation of wagons or for any purpose whatsoever, except for carrying out shunting operation, after which the angel cocks should again be opened to ensure continuity of brake pipe and feed pipe.

11. Do ensure that the isolating cock of feed pipe of all the wagons in the open position. The handle of cock shall be vertically down when open and at horizontal when closed.

12. Do ensure that gauge in guards compartment show pressure not less than 5.8 kg/cm2 in feed pipe after the system is fully charged.

13. Do ensure that feed pipe hose coupling are connected to form a continuous passage from locomotive to last vehicle.

PROBLEM DEFINATION

- As mentioned above there are 2 pipes present in the Braking system. Feed Pipe and Brake pipe.
- In the process of POH the pipes has been cleaned with a long process so that all the rust , dirt and paint on the pipe is removed.
- The process of cleaning the pipes require a gang of 5 to 6 workers.
- The process includes :
- Disassembly of the pipes from the frame.
- Heating of the pipe using a gas cutter.
- Hammering of the pipe for removing the rust and dirt

Using of wire brush to scrap the remaining paint or rust

EFFECTS OF HEATING ON M.S. PIPE

- Heating the metal may result in property changes
- Higher temperature can destroy steel and other low alloy metals.
- Some deterioration in mechanical properties can occur if the heat treatment is administered prior to forging and other mechanical processes.
- Mechanical deficiencies that occur from using too much heat can affect the treated metal's toughness and impact strength.
- A mechanical deficiency can cause the orange peel effect. The orange peel effect is when the surface has hard and soft spots all over it.
- Brittleness is another problem.
- Applying too much heat causes this problem.

CHAPTER 4

MODEL

4.1.BEFOREASSEMBLY

4.2. AFTER ASSEMBLY:

CHAPTER 5

SOLUTION

- Compressed air up to 10kg/cm2 is available in the workshop which is supplied throughout the workshop through pipeline.
- This compressed air is used as a power source for the equipment.
- This compressed air is attached to the equipment using flexible pipe connected to pipeline carrying compressed air.
- Then using the air control valve the pressure is adjusted as per the requirement.
- This air is released through the nozzle attached.
- This nozzle concentrates the air to a particular area.
- The worker then moves this jet close to the surface of the brake and feed pipes from start to end with the nozzle facing the pipe surface.
- This makes the dirt to get removed from the pipe surface.
- The areas where there is more dirt accumulated and hardened are cleaned by adjusting the air control valve at high pressure.
- This high pressure jet cleans all the dirt and paint which helps to find any crack or damage on the pipe surface.
- This reduces the number of workers required for this operation.
- This method does not decrease the strength of the mild steel as it happens in the older method.
- It is also faster and convenient.

CHAPTER 6

CONCLUSION

CONCLUSION

- After using the method the metal properties do not get affected
- The number of workers which was needed for the whole process is reduced
- The time which was taking to finish the whole cleaning process is reduced

CHAPTER 7

FUTURE SCOPE

CHAPTER 7

The future scope of the project is that after the implementation of this model the following is achieved:

The design can be used in railways in pipe cleaning process.

It can also be used in other railway workshop all around india.

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