

Name of the department: - Rubber Technology

Event Description

Due to covid 19 these time also kaizen event was organized online on Microsoft team's application. The kaizen 2k21 event was organized by Rubber Technology Department of the institute with great enthusiasm and support by all faculty members and students. The event was scheduled on 22nd April 2021. Total 6 UG group projects of 32 students & 1 PG student were presented their projects on Microsoft teams. 6th & 4th semester students were also present in the event. Projects prepared by all the students are well prepared, innovative and technically sound. Some of them are quite helpful to the society and industry. The students were happy to show case their work to all the facilities and judges. The environment had been very vibrant on both the days. The facilities and judges were delighted to see the overwhelming response of the students. Special appreciation is due to the faculty members who whole heartedly guided the projects and participating the events.

Under graduate Projects

1. **Project Title:** Substitute Of Viton Rubber Products In Electrical Vehicles (Evs)

- **IDP-** Industry defined Project
- **Prepared by:**

1	170280126008	Chotaliya Kishankumar Jayantibhai	7405205423	chotaliya.kishan.33@gmail.com
2	180283126002	Kumbhar Premsagar Sanjay	7745029001	premsagarkumbhar@gmail.com
3	180283126004	Pandey Saurav Vivek	9987333511	sauravpandey1997@gmail.com
4	170280126028	Tank Jayesh Vallabhbai	9586821129	jayesh.tank1604@gmail.com
5	180283126001	Doshi Varun Vipul	7021478059	varundoshi2399@gmail.com

- **Abstract:** - Electric vehicles (EVs) powered either by battery, fuel cell or full cell hybrid systems have gained great attention over the past few years around the world as a viable solution to decrease greenhouse gas emissions and to maintain a clean and healthy environment curtailing the adverse effect produced by using internal combustion engines (ICEs) in the transportation and energy production sectors. Due to the increase in price of every raw material the cost of product is increasing day by day. So for customer satisfaction and for the betterment of customer we have selected the AEM (ethylene acrylic elastomer) elastomer to substitute in place of fluoropolymer elastomer. As we all know fluoropolymer (Viton) elastomer price is very high so the manufacturing cost of any product related to these will be costly. To curb this problem of the manufacturer and the customer we have tried to manufacture a battery seal based on ethylene acrylic elastomer which price is one third of the fluoropolymer elastomer. As u can see the difference is huge. Manufacturing of battery seal in ethylene acrylic elastomer achieves the same property which a fluoropolymer elastomer product achieves. Automakers are also reducing the size of powertrains engines to cut fuel consumption in addition to using advanced air management system to improve properties.

Not funded project

- **Guided by:** Prof. Sunil Padhiyar

2. Project Title: Biodegradable Gloves

- **IDP-** Industry defined Project
- **Prepared by:**

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- **Abstract:-** Market of Disposable medical and surgical gloves have been increased steadily since the Covid pandemic has arrived and the demand for these gloves have sky rocketed. Increasing gloves production resulted in an increase of its solid waste disposal. The Global Development Research Centre reported that 57 – 80 % of rubber solid wastes are disposed of in a landfill. Other than that, it falls into open burning, incineration, sanitary landfill, open dumping, recycling, and other. In fact, burning of NRL films or rubber waste products will increase the formation of hazardous gaseous gases such as carbon dioxide which makes it harmful either way. As gloves are a single used application, used gloves have to disposed after usage. The disposed gloves normally will take more than 2 years to degrade in the natural environment. The nature of latex/rubber products, especially gloves are not meant for recycling or reused. The problems with rubber/latex products is the formation of crosslinks for elasticity properties which contributed to the complexity of the products to be recycled. For latex products especially medical gloves it is impossible for the used gloves to be reused again. So due to the increasing environmental problems created by landfilling of gloves, we decided to choose our project be a waste management for these gloves. Medical/Surgical Gloves could not be reused or recycled because of various reasons above mentioned. After a lot of research we came with two most appropriate solutions. Make the gloves bio degradable with help of an external bio degradable agent (in formulation method). Create an accelerated environment for existing rubber gloves to degrade in soil faster and better. Thus, these methods will help our society to overcome larger dumping of rubber/latex gloves and will help to create a sustainable environment. This might help us to fight this pandemic with ease even there will be a much larger need of the latex gloves.

Not funded project

- **Guided by:** Prof. Bhakti Patel

3. Project Title: Improvement In Antimicrobial Resistance Of Silicone Rubber In Medical Implants

- **IDP-**. Industry defined Project
- **Prepared by:**

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4	170280126014	Makwana Tejendrakumar Dineshbhai	7575817885	tejendra.makvana97@gmail.com
5	170280126022	Ranoliya Sahil Gopalbhai	9714942711	sahilpatel0702@gmail.com
6	160280126002	Asalaliya Harshilkumar Kanjibhai	8320279195	hasalaliya26399@gmail.com

- **Abstract:** Medical implants made from rubber have a potential danger of being contaminated with bacteria and other microorganisms when they come in contact with blood. A need for protection against this contamination is inevitable for an implant to be used in human contact. Hence in this project we have studied the antimicrobial effect induced in Silicone Rubber implant by adding different additives with replacing the current antimicrobial additive (silver ion) and carried out the comparative study.

Not funded project

- **Guided by:** Prof. Anal Bhatt

4. Project Title: Waste Polyurethane Rigid Foam Use In Construction Application

- **IDP-**. Industry defined Project
- **Prepared by:**

1	170280126002	Amipara Keyur Pravinbhai	9712744970	keyuramipara2001@gmail.com
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3	170280126010	Italiya Shankeshkumar Pravinbhai	9537430224	shankeshitaliya@gmail.com
4	170280126006	Boricha Dhaval Himatlal	9725021541	dhavalboricha9@gmail.com
5	170280126030	Vala Jaydip Kishorbhai	9737443509	valajaydeep414@gmail.com

- **Abstract:** - As we can see strength of construction of buildings is decreasing day by day. Our project is based on “waste rigid polyurethane foam”. The global polyurethane market is estimated to have been USD 43.19 billion in 2016, projected to register a CAGR of 5.6%, between 2016 and 2021. The market growth is attributed to high demand in the building & construction application, transportation and automotive sector. A Polyurethane, which is not recyclable and it doesn't melt and so we can't use into reform process. We have used waste polyurethane foam for our project to reduce the waste polyurethane foam in the market. We have

used waste polyurethane foam mixed with cement, aggregate, and water and cellulose fiber. Polyurethane has very good physical and chemical properties like temperature resistance, water resistance, chemical resistance, abrasion resistance etc. We have made block type structure for better properties used in construction application. Our main purpose is to reduce cement content and replace it with waste Polyurethane with margin of 20-25%.

Not funded project

- **Guided by:** Prof. Gnanu Bhatt

5. Project Title: Biodegradable polymers

- **IDP-** Industry defined Project
- **Prepared by:**

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3	170280126021	Ramoliya Navdeep Nandlalbhai	8000033584	Navdipramoliya10@gmail.com
4	170280126023	Sathvara Hardik Danjibhai	9106991946	hardiksathvara111299@gmail.com
5	170280126003	Asodiya Jayeshkumar Sureshbhai	8511640381	jayeshasodiya2000@gmai.com

- **Abstract:** - Thermoplastic starch/natural rubber polymer blends were prepared using directly natural latex and cornstarch. The blends were prepared in an intensive batch mixer at 150 °C, with natural rubber content varying from 2.5 to 20%. The blends were characterised by mechanical analysis (stress-strain) and by scanning electron microscopy. The results revealed a reduction in the modulus and in tensile strength, becoming the blends less brittle than thermoplastic starch alone. Phase separation was observed in some compositions and was dependent on rubber and on plasticiser content (glycerol). Increasing plasticiser content made possible the addition of higher amounts of rubber. The addition of rubber was, however, limited by phase separation the appearance of which depended on the glycerol content.

Not funded project

- **Guided by:** Prof. Riyaz Modan

6. Project Title: Ice Repellent Coating

- **IDP-** Industry defined Project
- **Prepared by:**

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- **Abstract:** Purpose of ice Repellent Coating is to remove ice on Airplane, Car Body & Electrical Cable. It will also provide smooth surface finish and excellent coverage with rapid drying. We can apply ice repellent paint by roller, brush or spray. It will create flexible coating that also provides durability and protection from extreme weather condition. Thus we can avoid expensive cleaning procedure. The term "Ice Repellent" refers to the process of reducing ice formation on the surfaces by addition of some special additives. The main objective of ice Repellent Coating is to reduce ice formation on surfaces of Substance. We focused on passive method to reduce ice adhesion. Anti-ice layer is coated on substrate which repel ice. The ice Repellent Coating prevent the reshaping of the surfaces of aero planes and cars body due to the formation of ice. The ice Repellent Coating is to reduce ice adhesion Strength between Ice and Surface. This Coating is Solve big problem of Colder Country.

Not funded project

- **Guided by:** Prof. Priyanka Chavda

Post graduate Project

❖ **Project Title:** RUBBERIZED TRACK FOR ARMOURED FIGHTING VEHICLE

- **IDP-** Defense Problem statement
- **Prepared by:**

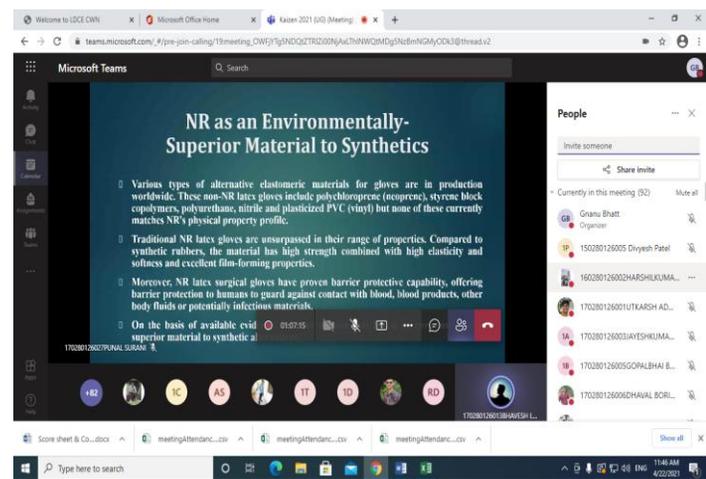
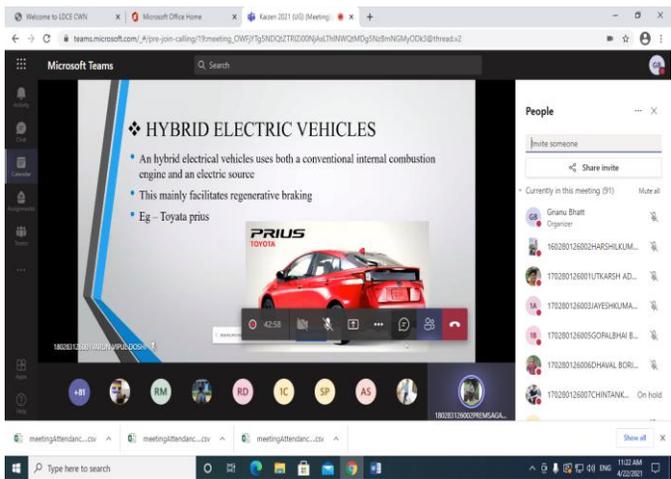
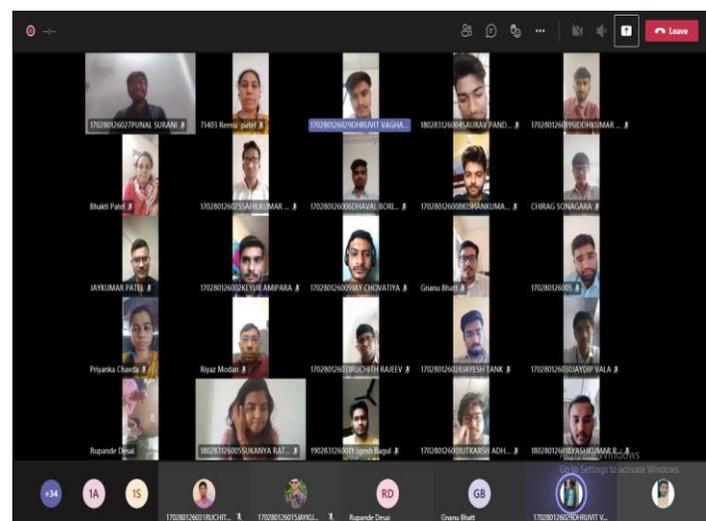
1	Ankit Vandra	190280740004	9099830572	ankithvandra@gmail.com
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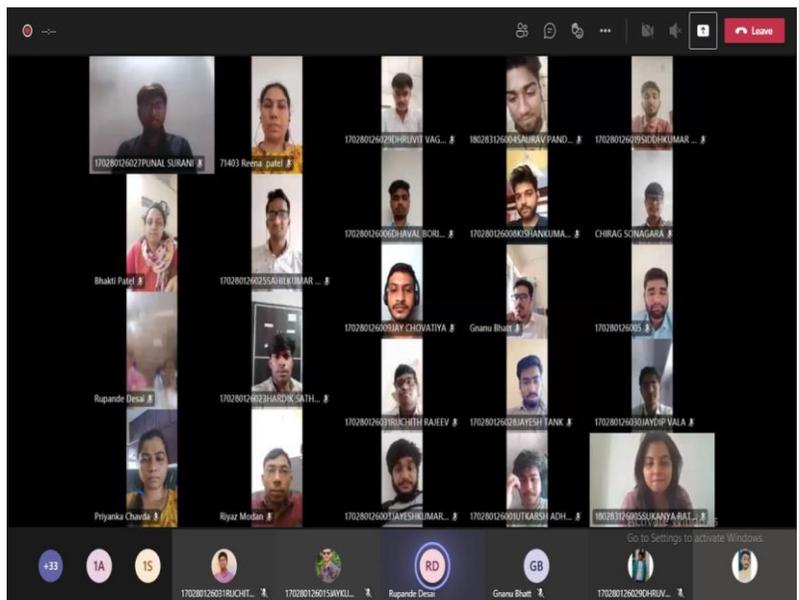
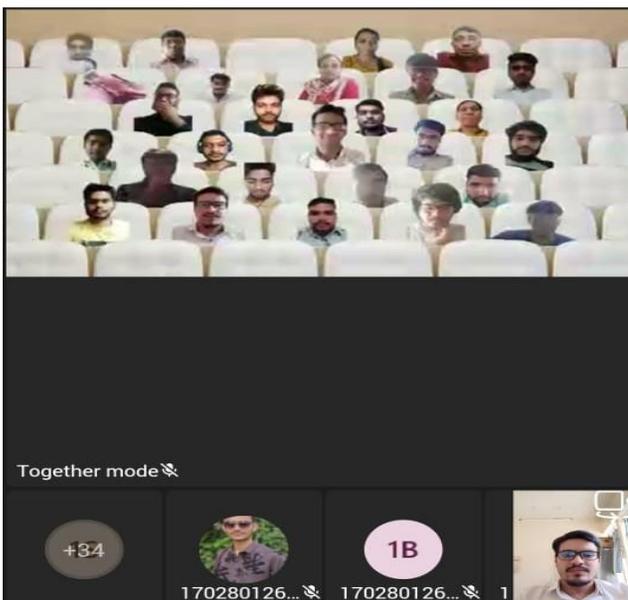
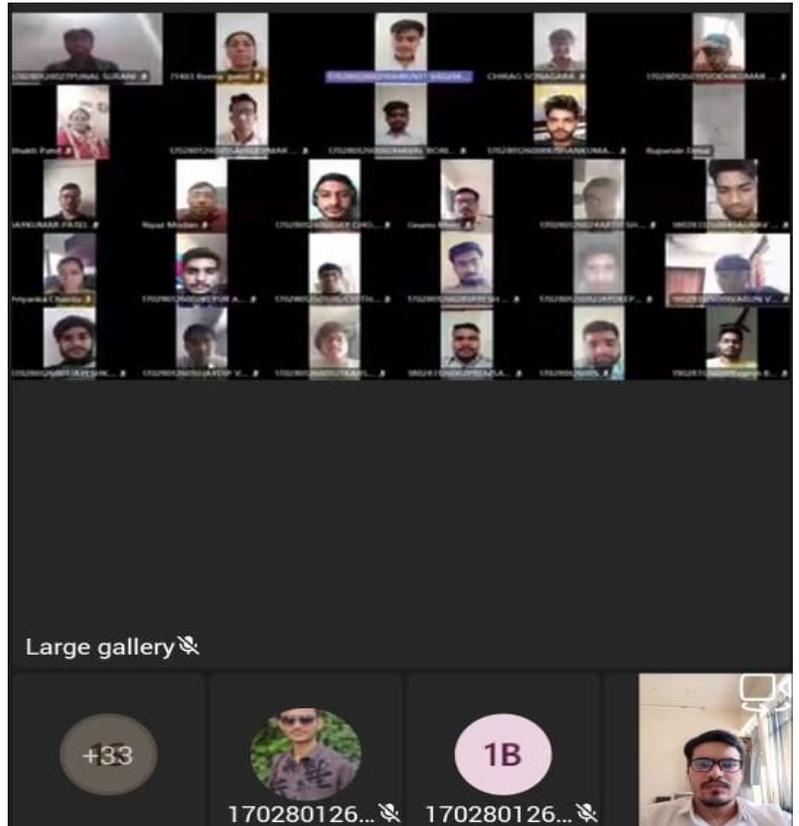
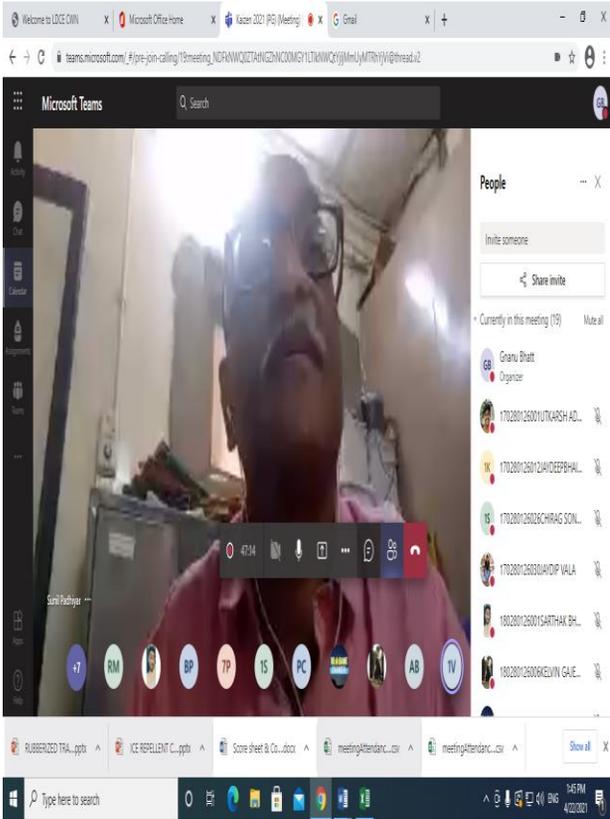
❖ **Abstract:** In India steel tracks are generally applicable for the Armoured Fighting Vehicles. Steel tracks have several limitations like generation of high noise and vibration which cause to increase crew fatigue, also they having lower speed and less fuel economy and steel tracks also damages the roads/tracks. However rubber offers superior properties which eliminate the restraint of steel tracks. Rubber tracks nullify the noise and vibration issue and provides significantly increases the performance of vehicles with high speed. Also, rubber tracks reduces degree of weight. In following project we combine the properties of Natural rubber and Synthetic rubber, limitations that we are observing in steel tracks can be eliminated and also improve the design of tracks that will benefit to the overall performance of the Armoured fighting vehicle.

Not funded project

- **Guided by:** Dr.Rupande Desai & Prof.Bhatt Gnanu

Evaluation Screenshot





Details of Innovative and Industry useful projects

Title of project: -Waste Polyurethane Rigid Foam Use in Construction Application

Name of Team Members: - Amipara Keyur Pravinbhai, Chovatiya Jay Mansukhbhai , Italiya Shankeshkumar Pravinbhai , Boricha Dhaval Himatlal , Vala Jaydip Kishorbhai

Name of Guide: - Prof. Gnanu Bhatt

Outcome of Project: - As we can see strength of construction of buildings is decreasing day by day. Our project is based on “waste rigid polyurethane foam”. The global polyurethane market is estimated to have been USD 43.19 billion in 2016, projected to register a CAGR of 5.6%, between 2016 and 2021. The market growth is attributed to high demand in the building & construction application, transportation and automotive sector. A Polyurethane, which is not recyclable and it doesn't melt and so we can't use into reform process. We have used waste polyurethane foam for our project to reduce the waste polyurethane foam in the market. We have used waste polyurethane foam mixed with cement, aggregate, and water and cellulose fiber. Polyurethane has very good physical and chemical properties like temperature resistance, water resistance, chemical resistance, abrasion resistance etc. We have made block type structure for better properties used in construction application. Our main purpose is to reduce cement content and replace it with waste Polyurethane with margin of 20-25%.

Name of Industries for project Support: - Boney Polymer, Polyflux foam, Pravin rubber Engg Works.



Title of project: - “Substitute Of Viton Rubber Products In Electrical Vehicles (Evs)”

Name of Guide: - Prof. S.J. Padhiyar

Name of Team Members: - Chotaliya Kishankumar Jayantibhai, Kumbhar Premsagar Sanjay , Pandey Saurav Vivek , Tank Jayesh Vallabhbhai , Doshi Varun Vipul

- **Objective of Project:**

Electric vehicles (EVs) powered either by battery, fuel cell or full cell hybrid systems have gained great attention over the past few years around the world as a viable solution to decrease greenhouse gas emissions and to maintain a clean and healthy environment curtailing the adverse effect produced by using internal combustion engines (ICEs) in the transportation and energy production sectors. Due to the increase in price of every raw material the cost of product is increasing day by day. So for customer satisfaction and for the betterment of customer we have selected the AEM (ethylene acrylic elastomer) elastomer to substitute in place of fluoropolymer elastomer. As we all know fluoropolymer (Viton) elastomer price is very high so the manufacturing cost of any product related to these will be costly. To curb this problem of the manufacturer and the customer we have tried to manufacture a battery seal based on ethylene acrylic elastomer which price is one third of the fluoropolymer elastomer. As you can see the difference is huge. Manufacturing of battery seal in ethylene acrylic elastomer achieves the same property which a fluoropolymer elastomer product achieves. Automakers are also reducing the size of powertrains engines to cut fuel consumption in addition to using advanced air management system to improve properties.

Name of Industries for project Support: - Doshi polymer

Title of Project: Biodegradable Gloves

Name of Team members:

Ruchith Rajeev, Shah Arth Dhananjaykumar , Patel Siddhkumar Ashokbhai , Patel Jaykumar Chunilal , Lakum Bhavesh Savjibhai , Surani Punal Govindbhai

Name of Guide:

Prof. Bhakti Patel

Objective of Project:

- Market of Disposable medical and surgical gloves have been increased steadily since the Covid pandemic has arrived and the demand for these gloves have sky rocketed. Increasing gloves production resulted in an increase of its solid waste disposal. The Global Development Research Centre reported that 57 – 80 % of rubber solid wastes are disposed of in a landfill. Other than that, it falls into open burning, incineration, sanitary landfill, and open dumping, recycling, and other. In fact, burning of NRL films or rubber waste products will increase the formation of hazardous gaseous gases such as carbon dioxide which makes it harmful either way. As gloves are a single used application, used gloves have to dispose after usage. The disposed gloves normally will take more than 2 years to degrade in the natural environment. The nature of latex/rubber products, especially gloves are not meant for recycling or reused. The problems with rubber/latex products is the formation of crosslinks for elasticity properties which contributed to the complexity of the products to be recycled. For latex products especially medical gloves it is impossible for the used gloves to be reused again. So due to the increasing environmental problems created by landfilling of gloves, we decided to choose our project be a waste management for these gloves. Medical/Surgical Gloves could not be reused or recycled because of various reasons above mentioned. After a lot of research we came with two most appropriate solutions. Make the gloves bio degradable with help of an external bio degradable agent (in formulation method). Create an accelerated environment for existing rubber gloves to degrade in soil faster and better. Thus, these methods will help our society to overcome larger dumping of rubber/latex gloves and will help to create a sustainable environment. This might help us to fight this pandemic with ease even there will be a much larger need of the latex gloves.

Details of feedback from students /faculty members

Department feedback on conduction of the whole process:

As the department got the final guidelines for conducting Kaizen 2K21 on online platform, all faculty members and students started working on the same. All the final year students were being guided by their respective guides. Overall the whole process was conducted with ease by joint efforts of each member. Students were totally satisfied with the whole process. Rubber Technology Department had a great and amazing experience for conducting kaizen 2021 online.

❖ **Suggestion /expert with name:**

- **Prof. G.G.Bhatt:** I think we have to give more than 15 minutes to students so that they can explain their project on very good manner.
- **Prof. P.N.Chavda:** The event could be even greater if we could allow some extra time for junior students to interact with final year students so that they can discover new things. Which was earlier possible in offline event during project display.
- **Mr.Atul Shah (Expert):** For all branches final year students if possible arrange expert lectures for project presentation. At least 4- 5 session start from 6 semester.

❖ **Student's feedback with details of students like enrollment number /title of project:**

Saurav Pandey

Project name: Substitute Of Viton Rubber Products in Electrical Vehicles (Evs)

- "With all due respect 😊 It will be better if everyone will get chance to complete the presentation before question-answer session starts."

Poonal Surani

Project name : Biodegradable Gloves

- "Overall it was an exciting experience to see everyone through digital media. Everyone expressed views on project. Faculty praised us."

Department wise best practice to carry projects for students for a specific project case study

- At the beginning of the 7th semester, Different innovative project ideas proposals were being analyzed by the department faculty members and industrial experts.
- Suitable and truly innovative challenges currently possessed by Rubber industries were finalized as project topics.
- After finalizing project topics, the designing of team formation and project topic selection procedure were being carried out.
- For the team member selection and project topic selection, the total freedom was given to the students. But for the better enhancement, the whole procedure was being conducted under guidance of all faculty members.
- In order to fulfill the criteria of continuous evaluation, the registration of all the finalized teams were made on PMMS portal requesting to their respective guide.
- The students were being instructed to follow the PMMS portal regularly and the benefits of following PMMS activities were explained by their respective guides.
- According to the PMMS portal schedule, all the students and their guides followed the given guidelines. Continuous feedback and detailed analysis of students' work was done by all the guides to improve the quality of the projects with the help of PMMS activities.
- Students were made to present their work periodically on regular basis with the help of PowerPoint presentation. Continuous feedback by faculties was given to make sure their quality improvement.
- With the technical feedback, student's presentation skills, communication skills and the way of demonstration were also monitored by the guides for their personal growth as well as for the effectiveness of project.