

## **Engineering Competencies Claims (ECC)**

### **ECC EA1- Deal with Ethical Issues**

**Project Title:** Change Management, QNGR-Bombardier, Segula Technologies

**Date:** December 2019 – March 2021

I started working as a mechanical engineer to provide support to Bombardier Queensland New Generation Rollingstock Change management team in the multinational rail vehicle and infrastructure project, and for this project, I was accountable to perform the following major duties, i.e.

1. Analyzing the complex systems and developing solutions for the change management QNGR by coordinating with the different stakeholders
2. Assessing and managing engineering impacts to help drive and assist the project change board's decision to proceed.
3. Ensuring product safety and quality are maintained through the change process
4. Assist in improving project performance and preventing scope creep.
5. Ensure that all engineering changes comply with the relevant standards and legislation
6. Maintain the consistency and traceability of the project baseline by ensuring that all engineering changes to the baseline are performed in a controlled and traceable manner

During this project, I encountered many ethical issues while dealing and coordinating with the different stakeholders which were resolved by developing a series of ethical rules and then accumulating them in the form of ethical regulations. After this, I applied these ethical regulations and standards throughout the project tenure. These proposed ethical codes of conduct provided the personification of guidelines and principles about behaviors exhibited/displayed by each project member in the particular workplace and contacts or relations developed by all members within the workplace environment.

Hence, before commencing my allocated tasks, I applied professional ethical rules and provided control measures to reduce all those activities which could cause produce pollution or cause environmental damage. I ensured the awareness of OSHA and safety rules & regulations to maintain safety throughout the project and usage of quality and durable products to avoid a decrease in the efficiency in the change process. Furthermore, I discussed the proposed ethical rules & regulations with my team and seniors comprising of implementation of safety standards and processes, fair evaluation, respecting the opinions or suggestions of all project members despite their designation, developing a transparent and honest working environment, prohibition of favoritism or biases, implementation of relevant standards and legislations in all design work, provision of equal rights, coordination and communication with other departments, avoiding illegal and unethical activities, keeping the significant data confidential and avoiding sharing it with third parties, etc.

Therefore, by following ethical regulations, I frequently consulted with my senior engineers who were RPEQ's/CPEng qualified and respected their valuable feedback and opinions. In addition, by

practicing ethical codes of conduct, I appraised and motivated every single effort made by the team working under my supervision and shared the project deals with them openly and honestly, as well as, motivated them to practice an ethical code of conduct in their work. In this way, I eradicated the ethical issues.

Moreover, while dealing with the suppliers, I instructed that all items should fulfill quality standards criteria. I also discussed all supplier's related modifications made and were properly tested as per defined project requirements with the project manager and experts. For example, there were a few engineering changes that needs to be made in the processes of rollingstock/train, however, the suppliers did not have sufficient information regarding the testing, design changes, and standards. To deal with this ethical issue, I communicated with the relevant stakeholders during the Change Control Board Meetings and conveyed my concerns related to insufficient testing and design details for the change involved and also explained how it would negatively affect the process if we implement the change without proper testing or design compliance. In addition, if the requested change fails, then it would be going to consume a lot of budget for implementation without giving us the desired result. Through my explanation, the expert agreed to view the subject matter and requested all the stakeholders to submit a report showing proper testing and other details.

### **ECC EA2- Practice Competently**

**Project Title:** Project Engineer (Testing and Validation), RollTrac Product Development, EGR Brisbane

**Date:** Mar 2021 – Present

Being a project engineer, I was responsible to perform engineering tests in accordance with EGR and OE test requirements, liaising with test laboratories to execute product validation as per DVP requirements, working closely with different stakeholders, prototyping and testing of RollTrac, performing DFMEA of a single component of a RollTrac Accessory and expanding it to multiple mechanical systems and multiple projects and bids, etc. Throughout the project period, I referred to multiple conference papers, design manuals, guidelines, empirical methods, etc. This helped me to acquire advanced skills and knowledge to ensure that my selected approach/technique is the most applicable/relevant for design purposes. I also critically analyzed my competencies while performing a specific task and then took guidance and training to improve my skills.

I always believe in long-term professional development to ensure continuous improvement in every project of my life, that's why I assessed my competence by developing a professional development plan (PDP) and analyzed myself in a score of 1 to 5 to identify areas of improvement. In addition, I have also participated in performance review programs conducted after every six months at my workplace, where nominated assessors (managers and senior engineers) assess my level of work and performance against certain criteria, as well as, I also received feedback from my managers to improve my performance and competencies.

Hence, in my field, I have recognized the significance of updating and maintaining my professional skills, therefore, I took part in the following different training sessions, attended conferences and seminars, read research articles, enrolled in additional courses, etc. For instance,

- During the automotive accessory product development and testing and validation projects based in Australia and North America, I was responsible to conduct/organizing several Electrical and electronics engineering tests for components, i.e. RollTrac ECU, limit switch, dark current draw, etc. in-house and with other laboratories. However, it was quite challenging due to my limited knowledge of testing standards and procedures. But, I always consulted with Electronics and Mechatronics engineers to come up with test plans and procedures and understand various systems.
- I am a member of SAE International which gives me access to read the latest blogs, journal papers, and articles related to the latest automotive trends. Moreover, I also get access to OE DVP, standards, and requirements related to my current role. This allows me to get myself updated with the various automobile standards.
- To polish my technical skills, I referred to various learning platforms such as Edx, LinkedIn learning, Udemy, etc. In addition, I also attended multiple seminars and online conferences on platforms, for instance, LinkedIn and Engineers Australia. Moreover, I attended workplace training related to IMDS, Teamcenter, DFMEA at EGR Group.
- I have input all my CPD points in an excel spreadsheet against the various types with associated hours, topic, and presenter; and experience gained from professional work against the evidence matrix criteria.

I was recently tasked with completing the DFMEA for GM Hummer RollTRac Project, which was quite challenging for me because it required extensive knowledge in the RollTRac system involving numerous mechanical, electrical, and software systems-related technical work. So, to understand different failure modes, I liaised with CAD operators, FEA engineers, and senior engineers. Furthermore, I also took training from Engineering Technician in the assembly of Rolltrac from scratch to the installation of the same into the vehicle tub. This helped me to develop an understanding of the failure modes. I also took feedback and guidance on design and previous setbacks with the design from other senior engineers to understand the product.

### **ECC EA3- Responsibility for Personal Engineering:**

**Project Title:** BT1FM ROLLTRAC New Product Development and Universal Roof Rack System for USA Utility Vehicles, EGR Brisbane

**Date:** Mar 2021 – Present

I started working with my current company in March 2021 and I was tasked with the development of a Universal roof rack system including developing RFQ's, DFMEAS, negotiations with suppliers, design review, prototyping, product testing, and product approval. In addition, I also performed managerial roles to manage the suppliers, subcontractors, and team members. During the proposal stage, I studied and discussed the scope of works (SOW) and supplier's quotation with the management team before commencing my work. Since this project was mainly for the EGR and USA market, therefore, I remained in contact with all suppliers of China and established

daily progress tracking through skype with EGR and China personnel to ensure that the project is on track.

The first task which was undertaken by me was to explain the project proposal for product development to senior management to give a clear overview of the project timeline, project budget, and implementation strategy.

After getting initial approvals, I supervised the BT1FM RollTrac production work, and being a responsible person to confirm the durability and quality of the product, I had to perform the durability testing of BT1FM RollTrac. Based on my experience, I noticed that the RollTrac ECU failed to perform under normal operations, i.e. at extremely low temperature ( $< -20$  deg C), however, it was able to resume normal operations once the ECU alone was defrosted and the unfrozen ECU was also able to run the entire Roll Cover system frozen at  $-27$ -degree C. So, I made a judgment that there is a failure caused when the ECU alone is frozen and it wasn't an adequate product to meet the requirements/demands of the client. I immediately bring this failure risk to the notice of the senior management team and upon discussion with them, I performed a series of root cause analyses and further testings. Based on the testing results, I sent the ECU back to the supplier. I documented all the investigation activities EGR standard templates that were performed and saved them under a common folder, as well as, got them approved by senior engineers. Also, I sent the report to the supplier which eventually helped me to determine the root cause of the issue which was due to a non-conformance issue of a sub-component.

My next task was to choose the best fasteners for the Universal Rack System because while choosing the fasteners for the Universal Rack System supplier initially suggested using Grade 8.8 fasteners and Loctite DRI 204. However, to provide better loading capacity, I recommended our supplier opt for Grade 10.9 fasteners. The problem with using Loctite DRI 204 was that it had less breakaway torque and was less reusable. To handle these issues, I recommended them to opt for ND 593 Loctite which will help the customer to reuse the fasteners multiple times after screwing and unscrewing. Moreover, the chosen fastener was a cost-effective approach for me as well.

I communicated all development activities of the Universal Rack system to all stakeholders Suppliers, EGR Aus, EGR china, and EGR USA through e-mail and conducted virtual video calls. I also documented the product development methodology including all technical details, static and dynamic tests, cost-benefit analysis, and limitations. I stored all technical and project-related files under a common folder that was accessible to all EGR team members. This allowed anyone in the team to continue with the project in my absence. Also, during each Project Milestones, I consulted my manager and team members and discussed the next steps to be taken to reach the final goal of production approval. I also took feedbacks on my performance from my manager and takes all these into account to improve the project handling.

## **ECC EA4- Develop Safe & Sustainable Solutions**

**Project Title:** ROLLTRAC New Product Development

**Date:** Mar 2021 – Present

For the project of ECU V2 and Battery Management System for RollTRac, I ensured that the development involved all kinds of safe & sustainable solutions because, in this project, the most critical electrical components (ECU and BMS) were used for controlling the current of the system and functionality of other systems.

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