

Department of Mechanical Engineering
TECHNICAL REPORT ON RALLY CAR DESIGN
CHALLENGE (RCDC 2019)

The work has started in the month of July and ended in the month of September and participated the event competition on 2nd, 3rd and 4th October 2019 at Bikaner, Rajasthan.

Abstract: The objective of the work is to meet and improve the program outcomes and three mechanical engineering program specific outcomes, this work has initiated. To design and fabricate All Terrain Vehicle (ATR) model, the financial support of around Rs. 2.5 lakhs is mobilized with generous management support and Rs. 2.5 lakhs amount is collected by the students (Overall Rs.5 lakhs is spent by the students and management) to participate in RCDC 2019 competition on 2, 3 and 4th October 2019 in **RCDC Village, Bikaner, Rajasthan**. Total of 34 students, out of which 32 students are from Mechanical Engineering and 2 students from Aerospace Engineering have participated in this work under the guidance of Dr.P.Ravindra Kumar, with coordination and cooperation from Head of the department, Principal and with Management support.

As a part of the Technical report submission on Rally Car Design Challenge (RCDC2019) contest held **2nd, 3rd and 4th October 2019**, total of 29 teams all over India were came and presented their various (All Terrain Vehicles ATR) models. 17 Teams are under Tier 1 category, 9 teams are under Tier 2 category and 3 Teams are under Tier 3 category. The designed and fabricated ATR model presented in the event comes under Tier 2 category. Out of 29 teams, 13 teams are totally qualified in all rounds and run their vehicles on the given track provided by the RCDC committee. **Our Team Name: Desert Assassins, Vehicle No: 103** have qualified in Technical inspection round and went in to the track and made rounds within the stipulated time period provided by the RCDC committee.

Various Stages of work involvement in the design and fabrication of ATR model are presented below.

- ✓ Design and Drafting Stage
- ✓ Pipes and Metal Cutting Stage
- ✓ Frame work preparation
- ✓ Drilling and Grinding Operations
- ✓ Welding Operations
- ✓ Lathe works operations
- ✓ Engine Starting and Mounting Operations
- ✓ Transmission System Operations
- ✓ Steering system operations
- ✓ Suspension system operations
- ✓ Tyres fitting
- ✓ Overall assembling of components and safety checkups
- ✓ Technical Inspection Round at the RCDC village.



DESIGN REPORT OF SINGLE SEATER ALL TERRAIN VEHICLE (ATV)

- ✓ **TEAM NAME: DESERT ASSASSINS**
- ✓ **VEHICLE NUMBER: 103**
- ✓ **EVENT: RCDC 2019**
- ✓ **COMPETITION: TIER 2**
- ✓ **INSTRUCTOR: Dr. P. RAVINDRA KUMAR (Professor)**
- ✓ **TEAM MEMBERS**

✓ **DATE: 20-9-19**

S.NO	NAME	CONTACT	DESIGNATION
1	SUCHITH SAMUEL KUNDURTHI	9666238818	VICE CAPTAIN
2	B.SAI RAM NAYAK	7013059393	TEAM MEMBER
3	A.SUDHEER	7893684788	TEAM MEMBER
4	S. SANDEEP	9740147723	TEAM MEMBER
5	CHITTIMOJUSAI SATYA PRAKASH	9493482199	TEAM MEMBER
6	SHAIK AKBAR	7288036439	TEAM MEMBER
7	KARIMULA SK	9398352972	CAPTAIN
8	BHUKYA RAMDAS	8985354647	TEAM MANAGER
9	RASURI ROHITH	8019301656	BRAKE DESIGN HEAD
10	AMBATI PUJA SRI HARI KRISHNA	9515646688	TEAM MEMBER
11	SRIGIRI SRI HARSHA	6303505101	TEAM MEMBER
12	PUTTUPUTHARAKA AJAY KUMAR	9676204505	TEAM MEMBER
13	VANGIPURAMTIRUMALA PRITHVI	8919308377	SUSPENSION DESIGN HEAD
14	SAI KUMAR B	9010967726	TEAM MEMBER
15	ASHOK REDDY KOPPULA	7702649277	TEAM MEMBER
16	DARELLI.MICHEL	7731001017	TEAM MEMBER
17	SREE LAKSHMAN	6281088567	TEAM MEMBER
18	K.V.S.PAVAN KUMAR	7095603740	TEAM MEMBER
19	K KARTIK	7032670657	POWER TRAIN DESIGN HEAD
20	LANKA NAVEEN KUMAR	9866035360	TEAM MEMBER
21	L LAKSHMI NARASIMHA	9885399802	TEAM MEMBER
22	A. SREE RAM	7013622872	TEAM MEMBER
23	S. JAMALIAH	9010509430	TEAM MEMBER
24	KOTESWARARAO PRATHIPATI	6300527521	CHASSIS DESIGN HEAD
25	MATTHEW RAJEEVAN	9912160878	TEAM MEMBER
26	B. NAVEEN	7997879186	TEAM MEMBER
27	TARUN SANKURI	9177090246	TEAM MEMBER
28	MOHAMMAD HAMEED	8185857472	TEAM MEMBER
29	SAI CHAND BANAVATHU	8008264537	TEAM MEMBER
30	NISHADMOHAMMAD	8247587216	STEERING DESIGN HEAD
31	O. SAI MAHESH	9491726828	TEAM MEMBER
32	KHADARBASHA	7981906678	TEAM MEMBER
33	DWARAPUDI KALYAN	9573888928	TEAM MEMBER
34	V. RAVINDER REDDY.	8555027370	TEAM MEMBER











Learning Outcomes of the Event:

After the completion of the event, students learning outcomes

LO1: Develop the skills to acquire the engineering knowledge on Design and Draft the automobile vehicle.

LO2: Identify the various operations required in all terrain vehicle fabrication like pipes, frame cutting, drilling, machining operations grinding and welding operations.

LO3: Analyzed the design, failure and costing reports of the all terrain vehicle.

LO4: Develop the skills to work as individual and team works to finish the project works.

LO5: Apply the principles of thermal sciences to design, fabrication of products incorporating thermal systems relating to transmission of motion and power.

ARTICULATION MATRIX (Correlation between COs and POs and PSOs)

		POs												PSOs		
		1	2	3	4	5	6	7	8	9	10	11	12	PSO 1	PSO 2	PSO 3
COs	CO1	3	1	3	2		-	-	2	3		-		3	-	1
	CO2	2	3	1		2	-	-	2	3	2	2	2	3	-	2
	CO3	3	3	3	2	3	-	-	2	3	2	3	2	3	-	1
	CO4	1					-	-	2	3	2	1		2	-	1
	CO5	2	2	2	3		-	-	2	3		-	2	3	-	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

CONCLUSION

Students have gained knowledge in the field of designing through the virtual design and analysis with optimum usage. Our goal is to produce a design that met or exceeded the SAE criteria for safety, durability, and maintainability as well as provided features that would have mass market appeal to the general off roads enthusiast such as performance comfort and aesthetics, design decisions were made with each of these parameters which we have learnt through internships on automobiles.

Computational design and analysis software used is solid works, CATIAV5 were used to verify whether each part of the design met or exceeded its stated objective. Use of these design tools also allowed the team to address and rectify the conflicts between any interfacing before fabrication, saving both time and cost. Design goals were met, resulting in a final product that can withstand the rigors of off-road vehicle travel while providing the driver with necessary comfort's. The vehicle is appealing to the producer in manufacturability and reliability.

The use of AISI 1020 STEEL TUBES with 1 inch diameter and 2mm thickness which provides the high strength using bends in the frame geometry provides strength and allows for a faster fabrication process. The approach that followed is iterative in nature a process like reverse engineering and adopted in order to select various systems from the ones, to existing in the market.

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