Dr. Hemanth

2019-20

KARNATAKA COUNCIL FOR TECHNOLOGICAL UPGRADATION

ಕರ್ನಾಟಕ ತಾಂತ್ರಿಕ ಉನ್ನತೀಕರಣ ಪರಿಷತ್ತು

(A Joint Venture of Government of India & Government of Karnataka)
2nd FLOOR, VITC BUILDING, KASTURBA ROAD, BANGALORE - 560 001
2ನೇ ಮಹಡಿ, ವಿ.ಐ.ಟಿ.ಸಿ., ಕಸ್ತೂರಬಾ ರಸ್ತೆ, ಬೆಂಗಳೂರು – 560 001
Ph : 080-2286 6348 / 2286 0772 Fax: 080-22866607 E-mail: md.kctu@gmail.com / md-kctu-ka@nic.in.
Website : www.kctu.kar.nic.in

No. KCTU/R&D/REVA/MR/20/2018-19 Date: 15-09-2018

Sanction Order

Sub: Sanction of Financial Assistance to **M/s. REVA University, Rukmini Knowledge Park, Kattigenahalli, Yelahanka, Bangalore** under R&D Scheme.

Ref: 1. Go No. CI/151/SPI/2013(P1), Bangalore, dated 20-09-2013
2. Application of **M/s. REVA University, Rukmini Knowledge Park, Kattigenahalli, Yelahanka, Bangalore** for Incentives for Setting up of R&D Centers received from Institution on 21.02.2018.

***

KCTU is pleased to inform you that 8th State Level Committee (SLC) for sanction of Incentives held on 27-08-2018 has sanctioned Financial Assistance of Rs . **37.835** lakhs (Rs Thirty Seven lakhs Eighty Three thousand Five hundred only) to **M/s. REVA University, Rukmini Knowledge Park, Kattigenahalli, Yelahanka, Bangalore** for setting up of **"Development of Cost Effective Magnetorheological (MR) Fluid and MR damper for two wheeler and Four Wheeler automobiles to Improve Ride Comfort and Stability"** R & D Center on the basis of investment to be made on Machinery and Equipments in your institution located at **M/s. REVA University, Rukmini Knowledge Park, Kattigenahalli, Yelahanka, Bangalore** as per Government Order No. CI/151/SPI/2013(P1), Bangalore, dated 20-09-2013. The Committee noted the total project cost of Rs. **75.67** lakhs and accepted the investment on Machinery and equipments of Rs **75.67** lakhs and sanctioned Rs. **37.835** lakhs being 50% of the same.

You have to execute an undertaking in the prescribed format enclosed to this sanction order. The original undertaking should be on Stamp paper of Rs.200/-. The agreement should be executed by the Head of the Institution. The sanctioned incentive will be released through NEFT/RTGS as per the seniority maintained in KCTU office.

The following procedures to be followed in implementing the R&D scheme assisted by Government of Karnataka.

1. The R&D Institutions to commence the implementation of the R&D Projects without waiting for the GoK release of financial assistance, on receipt of the Sanction Order.
2. The sanctioned financial assistance to the R&D Centers will be released in 3 installments in the ratio of 50%:40%:10%. This assistance has to be utilized only for the purpose of which it was sanctioned.
3. The Institute has to submit the specific monthly implementation plan of the R&D activity. Accordingly the institution has to submit quarterly progress report for each quarter (for the quarters ending on June, September, December & March).

Registrar
REVA UNIVERSITY
Yelahanka, Bengaluru - 64.

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Yelahanka, Bangalore-64

REVA UNIVERSITY

Rukmini Knowledge Park
Yalahanka,Bangalore-560064
PAN :AABTR1107Q

2018-19 KCTU/R&D/MR/20/2018-19 (ME) Hemanth

Ledger Account

Project Cost 75.67 Lakhs
Govt Order No CI/151/SPI/2013(P1)
Institute Contribution Rs 37.835 Lakhs

1-Apr-2019 to 30-Sep-2020

Date		Particulars	Vch Type	Vch No.	Debit	Credit
1-4-2019	Cr	**Opening Balance**			**37,835.00**	
29-6-2020	Dr	**Cu Karnataka Bank A/c No 6662000100000901**	Receipt-2019-20	4467		18,21,972.00
		Cheque/DD RTGS-KCTU RESEARCH AND DEVELOPM-CORPH20181697859 29-6-2020 18,21,972.00 Dr				
		RTGS-KCTU RESEARCH AND DEVELOPM -CORPH20181697859 being amount recd towards KCTU Mechanical project Fund				
					37,835.00	18,21,972.00
	Cr	**Closing Balance**			17,84,137.00	
					18,21,972.00	**18,21,972.00**

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Application form for support to Research and Development Center for Development of Cost Effective Magneto-Rheological (MR) Fluid and MR Damper (Semi-active suspension system) for two wheeler and Four Wheeler Automobiles

1.	Name and Address of the Institution (To give full Postal address with pin code)	REVA University Rukmini Knowledge Park, Kattigenahalli, Yelahanka, Bangalore - 560064
2.	Constitution of the institution (enclose a copy Of Registration issued by the component authority)	Government notification and status are enclosed
3.	Registration No and Date	No. 770 dated 16.05.2013
4.	Details of any other approvals/registration/ Accreditation with Government of India/Govt Of Karnataka or any other agency.	Accredited by University of Grant commission (UGC)
5.	**Name and contact details of the contact person**	
	Name of the Chief Promoter	**Dr. M. Dhanamjaya**
	Designation	Registrar - REVA University
	Landline phone No	080-66226622
	Cell No	+91 99451 85445
	Email Id	registrar@reva.edu.in.
	Principal investigator:	**Dr. Hemanth K.** Associate professor School of Mechanical Engineering REVA University hemanth.k@reva.edu.in
	Co-Principal investigators:	**Dr. Devaraj S.** Professor School of Mechanical Engineering REVA University devaraj.s@reva.edu.in

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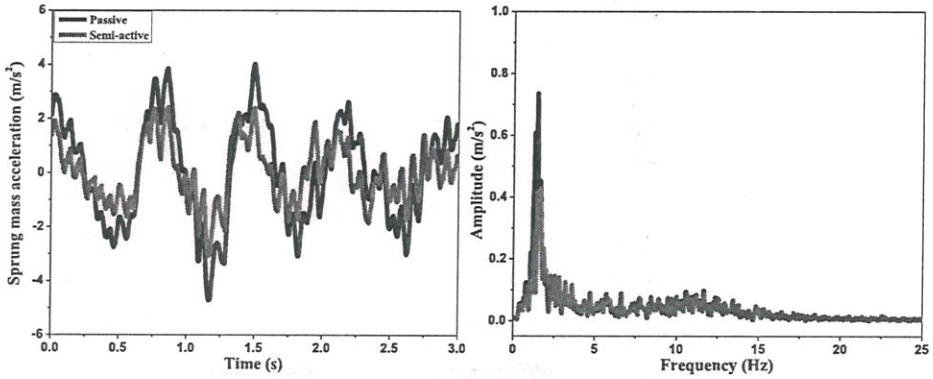
MR fluids are far less sensitive to contamination and extremes in temperature (150^{0}C and higher).

Currently MR fluid are not available in Indian market, it is supplied by UK based Lord corporation ltd. and UAE based Arus MR Tech ltd. but presently none of the Indian companies making MR fluid or MR based products. The first attempt to commercialize the MR damper application in automobiles was made by joint effort of General Motors (GM) and Delphi automotive systems. MR damper systems benefits such as variable damping and ability to adapt to changing road conditions has attracted many of the vehicle manufacturers. MR based suspension systems have been developed for variety of luxury/highly expensive cars such as Audi, Ferrari and land rovers.

Development of low cost MR damper for automobiles running on Indian roads is challenging task. Though many investigations are reported in the area of MR devices, above challenges prevents Indian automotive industries to implement this technology in existing vehicles. Cost involved in these commercial MR fluid dampers are the barrier for its usage in two wheelers, budget cars, trucks, buses and off road vehicles running on Indian roads. The solutions to all these problems will overcome by low cost MR fluid and MR damper.

7. **Details of preliminary investigation done if any of the project**

Studied the ride comfort and stability analysis of a passenger vehicle having MR fluid damper based suspensions system. Ride comfort and stability responses are evaluated under Indian average road condition. The ride comfort and road holding analysis of two degree of freedom quarter car model has been carried out with passive and semi-active (MR damper) suspension system. In semi-active suspension system, MR damper has been modelled by using both non-parametric approach and Bouc-Wen model. Ride comfort in quarter car is mainly affected by vertical movement of the vehicle body



Dynamic analysis has been carried out by using quarter car model with passive and semi-active

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	In vehicle suspension system is responsible for isolating forces from the road to the body, for directional control during handling, ride comfort and safety. Good ride comfort requires a soft suspension, whereas a hard suspension is required for stability or handling requirements of the vehicle. Passive and active control systems represent the two extreme reference points for damping strategies used for reducing dynamic response in any vibratory systems. Active control systems are costly and complex; alternatively, semi-active vibration control is one of the solutions to the above problem. Semi-active control system combines the best features of passive and active control approaches, offering the reliability and cost effectiveness of passive devices, yet maintaining the versatility and adaptability of active system. Semi-active vibration control can be achieved by having a damper with variable damping. MR fluid offers a change in viscosity and hence damping by simple application of magnetic field. Even though the theory is well understood to the research community, but still because of few problems still persists like MR particle settling during vehicle halts, optimal proportion of MR fluid constituents, MR fluid cost and complexity of damper controller design. In order to get better ride comfort and good handling characteristics for the vehicle, few issues has to be addressed to make the MR damper practically viable for end use.
9.	**OBJECTIVE OF THE R&D PROPOSAL** Currently MR fluid are available in Indian market, which is supplied by UK based Lord Corporation ltd. and UAE based Arus MR Tech ltd. But presently none of the Indian companies are manufacturing MR fluid or MR damper. MR based suspension systems have been developed for variety of luxury/highly expensive cars such as Audi, Ferrari and land rovers. But cost involved in these commercial MR fluid dampers are very high and it is a barrier for its usage in two wheelers, budget cars, trucks, buses and off road vehicles running on Indian roads. The solutions to all these problems will overcome by low cost in-house MR fluid and in-house MR damper. 1. Preparation and investigation of rheological properties of cost effective in-house MR fluid under different magnetic field and benchmark with commercial MR fluid. 2. Develop and characterize cost effective in-house MR damper for two and four wheeler automobiles. 3. Comparison of dynamic behavior of in-house MR damper with commercial MR damper. 4. Performance evaluation of passive damper, in-house MR damper and commercial MR damper with standard excitations

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Justification For Equipments

Rheometer

To evaluate performance and quality of synthesize cost effective MR fluid, the rheological properties fluid should be studied under different magnetic flux and different conditions. Prepare different proportion (20-40% volume of Magnetizable particle) MR fluid and characterize it under different magnetic field using rotational plate type rheometer along with external magnetic setup. The result will be compare with commercial MR fluid, in terms of performance and quality.

Damper testing Machine: - To evaluate performance and quality of the developed MR damper dynamic behaviour of damper will be study. In order to carry out this Damper testing Machine is very much essential.

Density Measuring instrument is required to measure the density of fluid.

Cost Sharing

Sl. No	Particulars	KCTU support In Lakhs	REVA University support In Lakhs
1	Promoters contribution-(REVA University) for Equipments	-	**34,83,500**
2	Promoters contribution-(REVA University) for consumable	--	**3,00,000**
3	Loan from Financial Institutions	-	Nil
4	KCTU support for Equipments	**34,83,500**	-
5	KCTU support for consumable	**3,00,000**	-
	Subtotal	**37,83,500**	**37,83,500**
	Total	**75,67,000 /-**	

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17	**Whether any Government dues are outstanding? If yes, give details thereof**	**NO**
18	**Whether any court cases? If yes give details thereof**	**NO**

DECLARATION:

I HEREBY DECLARE THAT THE INFORMATION, STATEMENTS AND OTHER PAPERS GIVEN HEREIN ARE TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE AND CORRECT IN ALL PARTICULARS. INCENTIVE GOVERNMENT RESOLUTION AND PRECAILING GOVERNMENT RULES AND REGULATIONS.I HEREBY ALSO DECLARE THAT THE EQUIPMENT SHOWN FOR THE PROPOSAL HAD/HAS NEVER BEEN PURCHASED BY THE INSTITUTE WITH THE FINANCIAL ASSISTANCE OF THE CENTRAL GOVT OR ANY STATE GOVERNMENT. I ALSO DECLARE THAT I AM AUTHORISED TO SIGN AN APPLICATION AND DETAILS AND DOCUMENTS SUBMITTED. A COPY OF AUTHORISED AND THE RESOLUTION OF THE COMPANY/ORGANISATION IS ENCLOSED.

Note: Any Financial transaction/expenditure statements submitted by the unit must be signed by the authorized signatory of the institute and certified by the charted accountant.

(Dr. M. Dhanamjaya)
Signature of Promoter/Authorized Signatory

Registrar
REVA University
Bengaluru - 560 064.

(Dr. Hemanth K.)
Signature of Principal investigator

Signature of Co-Principal investigators

1. Dr. Devaraj S.
2. Dr. Narayanaswamy

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ITW India Private Limited- Biss Division
Plot No. 497E, 14th Cross, 4th Phase
Peenya Industrial Area,
Bangalore-560 058
Phone No. 080 2836 0184
Fax No. 080 2836 0047
State Name : Karnataka, Code : 29
E-Mail : gemini@biss.in

Receipt Voucher

No. : **REC\BI\19-20\49** Dated: 2-May-2019

Particulars	Amount
Account :	
11013 Dr.Reva University	10,70,000.00
Agst Ref BiSS/SA1819/0122 10,70,000.00 Cr	

Through :
11101 Canar Bank 2454201002230 CA

On Account of :
being the amount received from the above customer

Amount (in words) :
Indian Rupees Ten Lakh Seventy Thousand Only

₹ 10,70,000.00

ITW India Private Limited BISS BISS Division, Bengaluru-58.
Authorised Signatory

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