TRACTOR DESIGN COMPETITION -2018
WORKSHOP REPORT

Program Name : **TRACTOR DESIGN COMPETITION Workshop II**

Date : **14th & 15th October 2017**

Venue : **Kongu Engineering College, Perundurai**

Number of Participants : 199 Students (22 Teams)

We are glad to inform you that SAEINDIA Southern Section conducted TRACTOR DESIGN COMPETITION Workshop-II - at Kongu Engineering College, Perundurai on 14th & 15th October 2017 Student Members of SAEINDIA from various engineering Institutions across India participated in the workshop.

In the inaugural Function, Dr. P. Navaneethakrishnan ,chairman SAEISS-Erode division and Head of the Department (Mechanical) Kongu Engineering College, Perundurai. welcomed the dignitaries and participants for Tractor Design Competition Workshop II and also gave a brief outline about the Tractor Design competition 2018 workshop

Thiru A. Venkatachalam Correspondent (KEC),
Dr. E. Rajasekar professor IRTT and Secretary SAEISS,
Mr. Armstong Principal Member (TAFE and MC member SAEISS,
Mr. C.Sivakumar Asst.Professor (BSACU),and TDC Champion SAEISS has lighted the Kuthuvilaku for TRACTOR DESIGN COMPETITION Workshop II

Dr. E. Rajasekar professor IRTT Secretary SAEISS, delivered memento to the hosting college to Thiru A. Venkatachalam, Correspondent (KEC) & S.Kuppusamy, Principal (KEC),

Thiru A. Venkatachalam Correspondent (KEC), & S. Kuppusamy Principal (KEC), has honoured the Dignitaries Dr. E. Rajasekar professor IRTT Secretary SAEISS, Mr. Armstong Principal Member TAFE,and MC member SAEISS,

Mr. Karthikeyan , Chief Design Engineer, TAFE,

Dr.R.Rajendran Professor BSACUand MC member SAEISS,

Mr. C.Sivakumar Asst.Professor BSACU,and TDC Champion SAEISS

Dr. E. Rajasekar (IRTT) Secretary SAEISS, S. Kuppusamy Principal, (KEC), Dr.P. Somasundaram , Head of Department (Automobile) has motivated the students about benefits & Features of TRACTOR DESIGN COMPETITION and also how to increase their knowledge in steering mechanism & Gear train Transmissions.

Day 1: (Group 3) Session

Dr. E. Rajasekar professor IRTT Secretary SAEISS has explained about Tractor Dynamics.

A tractor is an engineering vehicle specifically designed to deliver a high tractive effort (or torque) at slow speeds, for the purposes of hauling a trailer or machinery used in agriculture or construction. Most commonly, the term is used to describe a farm vehicle that provides the power and traction to mechanize agricultural tasks, especially (and originally) tillage, but nowadays a great variety of tasks. Agricultural implements may be towed behind or mounted on the tractor, and the tractor may also provide a source of power if the implement is mechanised.

Hitches and power applications

Drawbars

Until the 1940s, plows and other tillage equipment usually were connected to the tractor via a drawbar. The classic drawbar is simply a steel bar attached to the tractor (or in some cases, as in the early Fordsons, cast as part of the rear transmission housing) to which the hitch of the implement was attached with a pin or by a loop and clevis. The implement could be readily attached and removed, allowing the tractor to be used for other purposes on a daily basis. If the tractor was equipped with a swinging drawbar, then it could be set at the center or offset from center to allow the tractor to run outside the path of the implement.

Fixed mounts

Some tractor manufacturers produced matching equipment that could be directly mounted on the tractor. Examples included front-end loaders, belly mowers, row crop cultivators, corn pickers and corn planters. In most cases, these fixed mounts were proprietary and unique to each make of tractor, so an implement produced by John Deere, for example, could not be attached to a Minneapolis Moline tractor. Another disadvantage was mounting usually required some time and labor, resulting in the implement being semi permanently attached with bolts or other mounting hardware.

Three-point hitches and quick hitches

The drawbar system was virtually the exclusive method of attaching implements (other than direct attachment to the tractor) before Harry Ferguson developed the three-point hitch. Equipment attached to the three-point hitch can be raised or lowered hydraulically with a control lever.

Day 1: (Group 4) Session

Mr. Karthikeyan ,Chief Design Engineer, TAFE, has explained about Transmission

Transmission

Most older farm tractors use a manual transmission with several gear ratios, typically three to six, sometimes multiplied into two or three ranges. This arrangement provides a set of discrete ratios that, combined with the varying of the throttle, allow final-drive speeds from less than

one up to about 25 miles per hour (40 km/h), with the lower speeds used for working the land and the highest speed used on the road.

Slow, controllable speeds are necessary for most of the operations performed with a tractor. They help give the farmer a larger degree of control in certain situations, such as field work. However, when travelling on public roads, the slow operating speeds can cause problems, such as long queues or tailbacks, which can delay or annoy motorists in cars and trucks.

These motorists are responsible for being duly careful around farm tractors and sharing the road with them, but many shirk this responsibility, so various ways to minimize the interaction or minimize the speed differential are employed where feasible. Some countries (for example the Netherlands) employ a road sign on some roads that means "no farm tractors". Some modern tractors, such as the JCB Fastrac, are now capable of much higher road speeds of around 50 mph (80 km/h).

Day 2: (Group 4) Session

And also he explains about Gear transmissions power train & Calculations

Day 2 Group 3 session

Mr. S. Radhakrishnan, (Retired) Vice-President (R&D) from Rane TRW Steering Systems Ltd, Explains about steering systems

Steering Systems

Steering is the collection of components, linkages, etc. which allows any vehicle (car, motorcycle, bicycle) to follow the desired course. An exception is the case of rail transport by which rail tracks combined together with railroad switches (and also known as 'points' in British English) provide the steering function. The primary purpose of the steering system is to allow the driver to guide the vehicle.

Power steering

Power steering helps the driver of a vehicle to steer by directing some of its power to assist in swivelling the steered road wheels about their steering axes. As vehicles have become heavier and switched to front wheel drive, particularly using negative offset geometry, along with increases in tire width and diameter, the effort needed to turn the wheels about their steering axis has increased, often to the point where major physical exertion would be needed were it not for power assistance. To alleviate this auto makers have developed power steering systems, or more correctly power-assisted steering, since on road-going vehicles there has to be a mechanical linkage as a fail-safe. There are two types of power steering systems: hydraulic and electric/electronic. A hydraulic-electric hybrid system is also possible.

A hydraulic power steering (HPS) uses hydraulic pressure supplied by an engine-driven pump to assist the motion of turning the steering wheel. Electric power steering (EPS) is more efficient than hydraulic power steering, since the electric power steering motor only needs to provide assistance when the steering wheel is turned, whereas the hydraulic pump must run constantly. In EPS, the amount of assistance is easily tunable to the vehicle type, road speed, and even driver preference. An added benefit is the elimination of environmental hazard posed by leakage and disposal of hydraulic power steering fluid. In addition, electrical assistance is not lost when the engine fails or stalls, whereas hydraulic assistance stops working if the engine stops, making the steering doubly heavy as the driver must now turn not only the very heavy steering—without any help—but also the power-assistance system itself.

Speed sensitive steering

An outgrowth of power steering is speed sensitive steering, where the steering is heavily assisted at low speed and lightly assisted at high speed. Auto makers perceive that motorists might need to make large steering inputs while manoeuvring for parking, but not while traveling at high speed. The first vehicle with this feature was the Citroën SM with its Diravi layout,[2] although rather than altering the amount of assistance as in modern power steering systems, it altered the pressure on a centring cam which made the steering wheel try to "spring" back to the straight-ahead position. Modern speed-sensitive power steering systems reduce the mechanical or electrical assistance as the vehicle speed increases, giving a more direct feel. This feature is gradually becoming more common.

Active four-wheel steering

In an active four-wheel steering system, all four wheels turn at the same time when the driver steers. In most active four-wheel steering systems, the rear wheels are steered by a computer and actuators.[3] The rear wheels generally cannot turn as far as the front wheels. There can be controls to switch off the rear steer and options to steer only the rear wheels independently of the front wheels. At low speed (e.g. parking) the rear wheels turn opposite to the front wheels, reducing the turning radius, sometimes critical for large trucks, tractors, vehicles with trailers and passenger cars with a large wheelbase, while at higher speeds both front and rear wheels turn alike (electronically controlled), so that the vehicle may change position with less yaw and improved build-up

Students are actively listening the session in workshop

Mr. Armstong Principal Member (TAFE) and MC member SAEISS issued the memento to Dr. E. Rajasekar professor IRTT Secretary SAEISS,

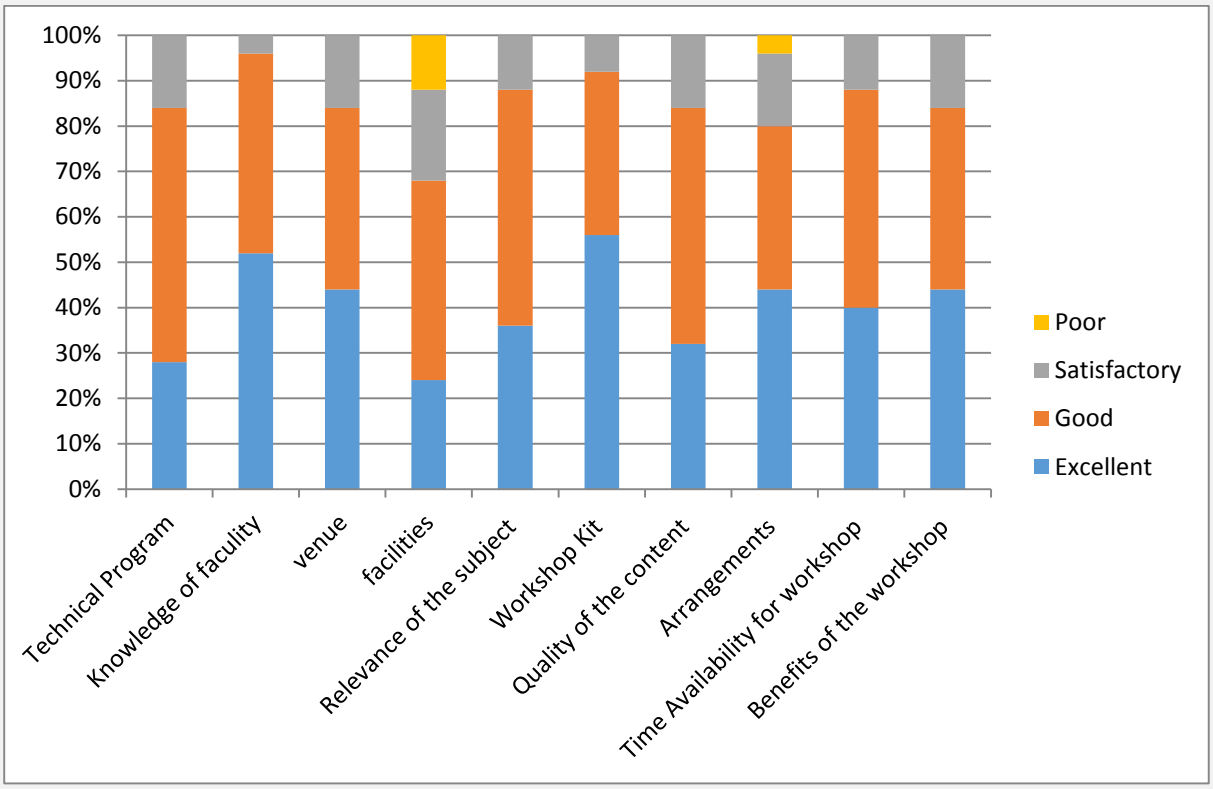
Dr. E. Rajasekar professor IRTT Secretary SAEISS, issued the memento to Mr. Karthikeyan, Chief Design Engineer, TAFE

Dr. Eswaramoorthy ,Dean & HOD (mechanical) Nandha Enginnering College issued the memento to Mr. S. Radhakrishnan, (Retired) Vice-President (R&D) from

Mr. Armstong Principal Member (TAFE) and MC member SAEISS, Dr. E. Rajasekar professor IRTT and Secretary SAEISS, Dr. Eswaramoorthy Dean & Hod (mechanical) Nandha Enginnering College, Mr. S. Radhakrishnan, (Retired) Vice-President (R&D) from Rane TRW Steering Systems Ltd, issued certificate to students who participated in Tractor Design Competition 2018 Workshop II

Group Photo with Participants

Program Feedback



Finally Mr. C.Sivakumar, Asst.Professor (BSACU), TDC Champion -SAEISS delivered the Vote of thanks. He thanked Asst Prof K. Bharathi raja, Mr. satheesh kumar and the management of Kongu Engineering College and Students for their continuous supports and cooperation for conducting the workshop and making it a grand success.

TDC 2018 Champion : Mr. C.Sivakumar, TDC Champion

Prepared by : Mr. S.Ruban Androse