A way of providing finer filtration, as well as give better sludge control, is to route a portion of the full flow oil through a finer bypass filter or centrifuge. The cleaner oil then exits directly to the sump. A centrifuge, a turbine type bypass separator unlike a bypass filter, relies totally on removing particulate from the system because of the “g” forces applied to the particles. This force separates the contaminants away from the oil as it spins and travels through the high speed rotating vessel.

In the case of engine centrifuges, the “g” force within the vessel is achieved by the pressurised oil within the vessel exiting through nozzles at the bottom and at such a rate to provide the necessary thrust to produce optimum revolution or RPM. The contaminants are forced to the inner circumference of the shell of the spinning vessel (see sketch bottom right) to form a layer of bonded sludge. The captured material is then disposed with the vessel at scheduled filter and oil change interval. In some centrifuge designs the vessel can be cleaned and retuned back to service.

Heavy duty diesel engine owners are pushing more than ever for extended oil/filter change intervals (ESI) in an effort to reduce operating costs. The conventional centrifuge with its empty design helps to achieve ESI by providing the necessary contaminant holding capacity within its large void volume. However, separation efficiency falls short of lower-capacity media-type filters. That is because particles must travel all the way across the turbine vessel to be separated from the oil (Fig. 1). Modelling with computational fluid dynamics software shows that flow through a conventional centrifuge “hugs” the central hub, rather than sweeping through the entire vessel (Fig. 1.). This was seen by Fleetguard Product Development Engineers as undesirable because the “g” force experienced by a particle is directly proportional to its distance from the axis of rotation. In other words, increasing the distance of the particle from the axis increases the “g” force applied.

Incorporating a stack off cones, hence “ConeStaC™” into the centrifuge, the oil flow is directed to the outer circumference of the vessel (Fig. 2). Once there, the oil still attracted to flow closer to the hub as previously described, travels at an inclined angle up between the small gap between each of the stacked cones or dishes. With the optimum “g” force at work now further out from the hub, the forced particle only has to travel a very small distance to make contact with the underside of the cone above it (Fig. 2). Once this contact is made, little flow resistance is experienced and the particle easily slides down the cone and forced out to the shell wall. Sludge formation within the oil is therefore reduced significantly more than a conventional empty shell design and paves the way for achieving even less engine wear and better results for ESI implementation.

CONESTAC™ cleans oil approx. 1/3 faster.
Technical Training & Quiz Bits

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1. Flow of oil through a conventional centrifuge:
   A Hugs the central hub to give lesser “g” force on the particulate
   B Hugs the central hub to greater “g” force on the particulate
   C Centralizes the flow to give equal forces on the particulate

2. The Centriguard™ ConeStac™ principle achieves the following over that of the empty shell design:
   A Reduced sedimentation distance and higher “g” force.
   B Increased sedimentation distance and higher “g” force.
   C Reduced sedimentation distance and lower “g” force.

3. The Centriguard™ ConeStac™ CS41000 is faster at clean up over the elements it replaces by approximately how much:
   A Twice
   B Third
   C Half

Previous test answers and lucky draw winners

MAY 01
1. C Lucky Draw Winners Michael Keeley – Burnie, TAS
2. C Rob Nixon – Newcastle, NSW
3. A Jeremy Pope – Masterton, NZ

You can photocopy this so others can participate.