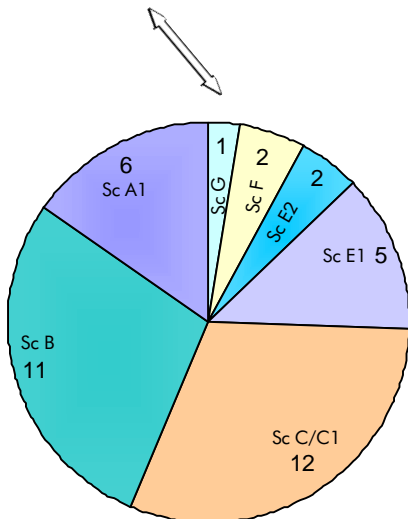
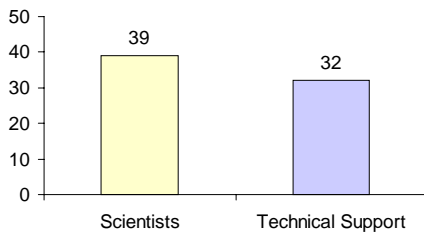


ADVANCED COMPOSITES DIVISION

SUMMARY

M Subba Rao, Head



During the year 2001-2002 the major R&D and other developmental activities undertaken by Advanced Composites Division (ACD) were mainly related to LCA, SARAS and other programmes of national relevance.

On the LCA programme the fabrication, certification and supply of all the CFC wing spars, fairing skins, fairing blocks, co-cured co-bonded fin and centre fuselage components for use on the PV2 aircraft are nearing completion. The modified rudder with a composite torque shaft has been fabricated and it will undergo structural qualification test shortly. The work on fabrication of the modified landing gear doors has progressed well and the fabrication of fairings for the forward and aft doors for PV1 have been completed. The additional requirements for the composites components for the fuel test rig being set up at HAL have also been met. The elaborate strain gauging and associated cabling work on the aircraft components, and the MAST aircraft as a whole, to carry out main airframe structural test at HAL are in progress.

In the SARAS project, ACD has the responsibility to develop control surfaces (elevators, rudder, ailerons and flaps), floorboards, wall assemblies and fuselage belly fairings. Accordingly, to carry out the static strength tests of the elevator, aileron and rudder have been

fabricated. Also, elevators (LH & RH), ailerons (LH & RH) and the seat and aisle floorboards have been fabricated for use on the first aircraft. The design and analysis review of flaps, belly fairing and floorboards have been carried out. The fabrication of the remaining components is progressing as planned.

Under the composites technology development and applications programme, efforts have been made to indigenously design and develop a CFRP fuselage belly fairing for the MiG-29 aircraft. Based on the successful flight trials carried out by IAF, this part has been cleared for limited series production.

Keeping in mind the future versions of LCA, the design of the wing test box, using the advanced stitching and co-curing technologies, has been frozen after a detailed review of the design. A prototype of the stitching machine has been specially designed and built for this purpose. The evaluation of mechanical properties of quick setting resins and adhesives for use in battlefields for quick repair of damaged aircraft have been completed under the banner of ARDB Centre of Excellence for Composites Structures Technology (ACECOST) (see /AC 16/).

The indigenously developed ABD 2000 fin antenna radome for the Indian Air Force (IAF) has successfully completed the flight trials and the

CEMILAC has accorded provisional type approval for limited series production. In response to an initial order placed by IAF for the supply of ten radomes, all the ten radomes were fabricated, tested and delivered to the Gwalior air base after obtaining the necessary clearance from CRI(A/c).

Besides all these R&D activities, the ACD had a major role to play in the organization of the specially designed workshop on "Repair Technology for Composites", of three weeks duration exclusively for the benefit of delegates from the Indian Air Force. This specially designed workshop was held at ACD from 26 November 2001 to 14 December 2001. The workshop was primarily organized as a part of exercise of setting up composites repair facilities at 11 BRD, Air Force

Station, Indian Air Force, Nasik, by the ACD. The seminar provided detailed information on composite materials, design, analysis, fabrication, non-destructive evaluation and repair qualification. The participants were also exposed to various equipment and the special hand tools that are required for this purpose. The course was found to be beneficial and greatly appreciated by the participants.

Convinced about the superior life and properties of CFRP bows developed by ACD, M/s Usha Martin Limited, Bangalore had placed orders for a further consignment of four sets of bows for their twinning machines and these were fabricated and supplied.

The major facilities such as 3m x 7m

computer controlled autoclave (an in-house development), ultrasonic c-scan test facility for NDE work, the water jet cutter, the static test rigs, the clean room, the cold chest, the computing facilities and a substantial amount of fabrication and processing facilities, employing advanced co-curing co-bonding techniques etc., specially developed for the purpose were extensively utilised for the completion of the projects in time.

A state-of-the-art dual focus 160 kV constant potential real time X-ray system, procured from YXLON, GmbH, Germany was installed at ACD during March 2002. The system manipulator has been designed in-house and is under fabrication. This X-ray system is expected to add further strength to the NDE prowess of the Division.