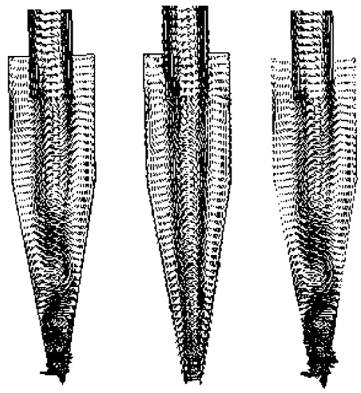
In this issue

Numerical techniques in swirling turbulent flows

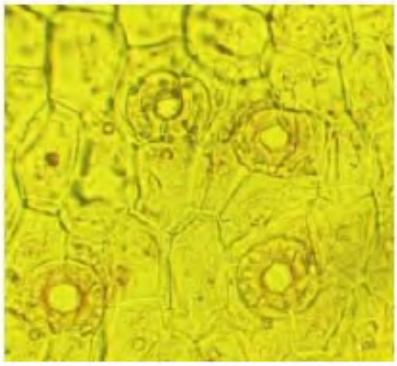
Recent advances in computers and computational techniques have made possible the use of numerical simulation as an equal and indispensable partner, along with theory and experiment, in the study of complex flows. An interesting example of complex flows is the strongly swirling flow in a cyclone separator which is widely used mainly for separating of the dense phase in a two-phase flow. Entrance of flow into cyclone can be axial or tangential through inlet section, which can be in different shapes



for each cyclone. Fluid mixture enters the cyclone and makes a double-swirl motion and the dense phase of the mixture is separated from the main flow by the centrifugal forces. It is difficult to analyse this problem since, in addition to its 3D character, there are many parameters influenced this flow. Therefore, this complex swirling turbulent flow in a cyclone requires efficient numerical techniques and turbulence models. Kaya and Karagoz investigate (**page 1273**), the performance of various numerical techniques and interpolation schemes for the highly swirling flow inside a tangential inlet cyclone, by comparing the predicted results with the experimental values. Additionally, a comparison between two isotropic turbulence models, namely the standard k–ε and the RNG k–ε turbulent models and the differential RSM which is an anisotropic turbulence model is also presented. Results obtained from the numerical tests have demonstrated that the key to the success of CFD lies with the accurate description of the turbulent behaviour of the complex swirling flow and adoption of relevant numerical techniques and interpolation schemes.

Stomatal response helps assessment of plant growth under stress

Opencast colliery of Tirap, Dehingpatkai reserve forest running for last many decades is responsible for devastation of part of Indo-Burma Mega biodiversity hot spot. In an attempt to rejuvenate such areas, stomatal behaviour of plant species to specific environmental stress was considered. Stressful situations were simulated by using coalmine tailings/overburden (OB) samples from Tirap colliery against unmine control. The stomatal response of Casssia (*Cassia streata*) and Dhaincha (*Sesbania rostrata*), two plant species with adaptability to mine OB, were studied by Deka Boruah *et al.* (**page 1310**). They observed that the edaphic environment created by mine OB substrate evoked a strong response in stomatal closure of the test plants. With low clay, silt and sand fractions the mine OB was inefficient at holding water. Low pH and poor nutrient status of mine OB might have compounded the stress.



Plants regulate their diurnal water status at a favourable level by controlling the stomatal aperture. With better relative water content the plants showed strong adaptation potential on mine OB. Although leaf photosynthesis decreases, stomatal contributes towards maintaining high water content and potential in the leaves to sustain growth although at much reduced rate. Stomatal response is undoubtedly a sensitive indicator of plant growth under stressful situations. The greater numbers of stomata per leaf with stomatal components of reduced size clearly indicate that Cassia and Dhaincha are potential candidates for rehabilitation of areas under typical coalmine tailings.