Preheater design advances

by L.V. Technology, Thailand

Since the introduction of the LV Classifier in 1998, LV Technology has continued to develop state-of-the-art solutions to the cement industry. These innovative designs have enabled the company to progress, with much success, from performing a wide range of cement plant modifications to also installing complete new plants.

The development continues from generation to generation such as the second generation of preheater tower with LV twin cyclones. Several contracts have been signed and are under implementation in Asia as well as in South America and a number of new contracts are in the pipeline. Now the fifth generation LV dynamic classifier has been released and more than 600 LV Classifiers are operating on upgraded mills.

In 2000 LVT introduced a new cyclone design which has been successfully installed in plants all over the world, both in the top stage preheater and as collecting cyclones for raw mills, coal mills and cement mills. The LV Cyclone is a high efficiency cyclone, which reduces the pressure loss, thus achieving a considerable reduction in fan power consumption. This reduction in pressure drop can be utilised to increase kiln capacity when the LV Cyclones are installed at the preheater.

LV Technolology has carried out a large number of modifications in cement plants and with much success has moved onto installing complete new plants. From being a company well known for its modifications of vertical mills, LVT has now developed into one of the leading cement engineering companies in the world for upgrades and complete new cement plants.

LVT procedures for kiln system upgrades

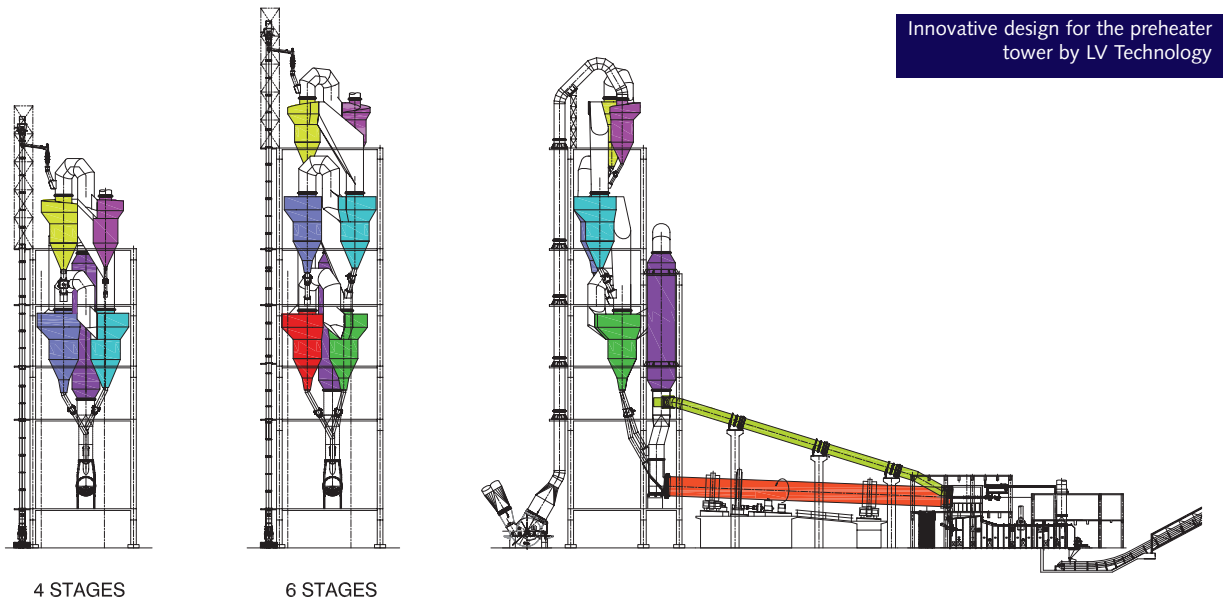
LV Cyclones reduce the pressure drop across the preheater and increase the dust collection efficiency. In the case of retrofitting existing cyclones, LVT looks at re-using the existing cyclone bottom cone as much as possible to reduce costs and downtime. A reduction in pressure drop over the preheater can also be achieved by modifying the material spreader boxes to the LVT design type which, in principle, transfers the downwards material velocity in to horizontal spreading and thereby takes out the previous pressure drop due to breaking of line material. After the modification only the material acceleration part of the pressure drop will be left.

LV Calciner technology utilises the following principle to achieve optimum combustion. The introduction of tertiary air to the calciner/mixing chamber means

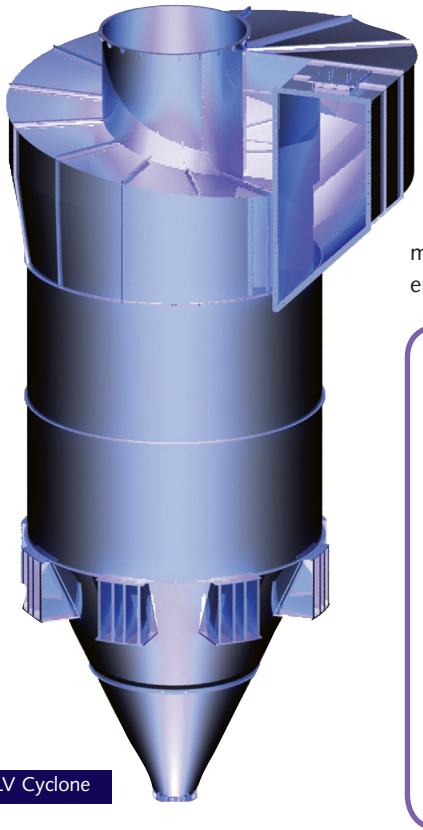
- the tertiary air duct will enter without enlargement of flow area ie with full velocity
- the tertiary air will enter in a fully tangential position.

The effect of this leads to better mixing of kiln exhaust gas, the calciner fuel and the tertiary air resulting in an improved degree of burn out of the calciner fuel within the same calciner retention time (volume). This is an important effect to obtain – especially in the kiln upgrade projects, where the calciner volume cannot be increased as needed due to existing site conditions.

Based on LVT's unique cyclone, a high efficient preheater tower has now been designed. A cyclone tower can be



Innovative design for the preheater tower by LV Technology



LV Cyclone

constructed with twin LV Cyclones on each deck without losing the advantages of low pressure drop. Having two LV Cyclones on each level reduces the height of the preheater tower considerably, thereby lowering the cost of civil engineering and materials as well as decreasing costly erection time.

Table 1 compares a 5000tpd six-stage preheater with the new LVT arrangement of cyclones and a six-stage preheater of same capacity with a conventional arrangement of the cyclones.

LVT's cost-effective and state-of-the-art flexible solutions, place the company as a worldwide leading supplier of cement equipment and engineering design.

Table 1: LVT arrangement vs conventional arrangement (six-stage preheater for 5000tpd)

	LVT new arrangement	*Conventional*
Height from centre line of kiln	92m	120m
Footprint of preheater structure	480m^2	400m^2
Floor area	1440m^2	2400m^2
Δp outlet top stage	52mbar	47mbar