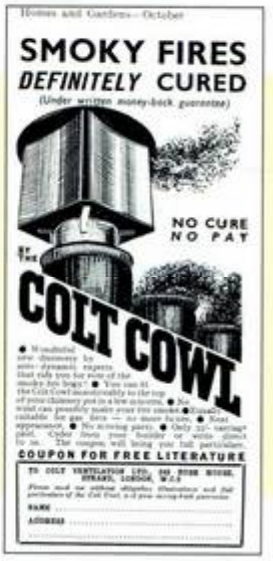
COLT INNOVATIONS 1

The Colt Cowl

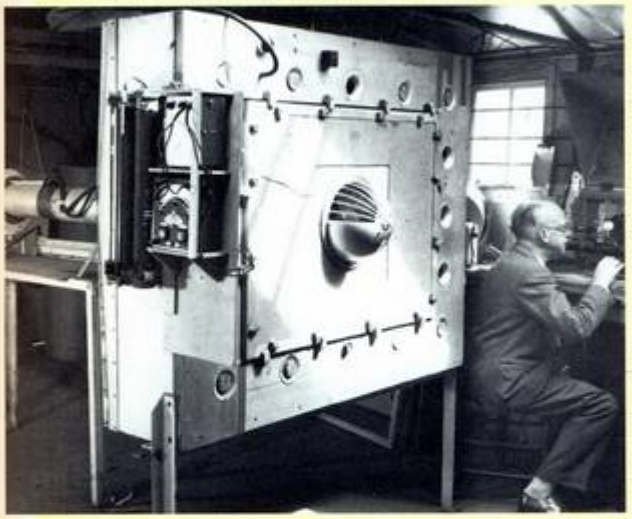
The Colt Chimney Cowl, which was patented in the 1930s, is designed to stop downdraft in the chimney of a solid fuel fire from blowing smoke back out into a room. The four vanes, which work on the same principle as aeroplane wings, are mounted vertically. When a wind blows, the aerodynamic effect causes a drop in pressure in the chimney pot and counteracts the downdraft.



COLT INNOVATIONS 2

The Colt Two-Way Fan

The Two-Way Fan is an example of the inventive genius of Gordon Davies. Faced with the problem of providing a mechanical window fan which would both extract stale air and bring fresh air in, he devised a unit that achieved this with a single fan and motor, thus eliminating the need for two impellers.



The innovative step was to change the orientation of the propeller fan so that its shaft was parallel to the plane of the window rather than at a right angle to it. In addition, the spherical casing of the fan was divided internally into a top and a bottom half by a plate. There were four grilles in the casing positioned diagonally opposite each other, two on the outside of the window and two on the inside.

As the fan rotated, fresh air was drawn from one of the outside grilles, through the unit and diagonally into the room. An equal amount of stale air was extracted through the other grille and passed to the outside. Thus, balanced ventilation was achieved without drawing air from other parts of the building.

It did not matter that there was a degree of mixing within the impeller because the unit provided enough fresh air for a room of up to four people. A heater and a filter were available as extras.

COLT INNOVATIONS 3

Aluminium Alloy

Colt pioneered the use of high grade aluminium alloy in the manufacture of roof ventilators. Previously, the only material in use was steel which had to be painted, galvanised or protected with a bitumen coating. Aluminium alloy came into its own as a result of wartime developments in the design of aircraft which called for a material that was durable and had a good strength to weight ratio.

In a joint project, Colt's R&D department and the company's principal material supplier set out to develop an aluminium alloy with good engineering properties and able to withstand industrial atmospheres without the need for a special surface treatment.

They came up with an alloy containing manganese, copper, zinc and chromium. Its lightness avoided the need for expensive structures to strengthen the roof and made the installation process much easier.

The many ventilators manufactured by Colt in the 1950s that are still in working order today bear witness to the strength and durability of the alloy.

COLT INNOVATIONS 4

The Colt Survey

Alongside the development of new products in the 1940s and 1950s, Colt introduced diagnostic methods for analysing customers' overheating problems.

The Colt technical sales force was provided with an impressive range of measuring instruments to assess air flow, temperature and heat gains from plant and other sources. Area managers were trained in the skills of problem solving on site by means of a carefully constructed survey technique.

The subsequent survey report to the customer detailed not only the conclusions reached but also the heat gain calculations and other relevant factors.

The Colt survey remains a valuable diagnostic tool today.

Part of the survey equipment used by Rudi Kohner in the 1940s. On the left is the Filtometer made by Metrovick which measures the pressure drop across air filters. The square instrument on the right is the Poole Airmeter, made by Oldham & Sons Ltd, for measuring air velocity.

COLT INNOVATIONS 5

Fire Ventilation

Colt introduced fire ventilation in the 1950s and turned conventional wisdom on its head.

During the Second World War people were told to close all doors and windows in order to starve a fire of oxygen. This advice did not take account of the fact that, in all but a domestic-sized room, there is enough oxygen to keep a fire going to the point when the heat generated will destroy the fabric of the building. Nor did it allow for the risk to the occupants from smoke inhalation and flashover.

Technical papers published as a result of a research project funded by Colt.

The advent of large single-storey industrial buildings of the type found in motor car manufacture was the trigger for the introduction of natural ventilators for smoke control. Colt had to overcome initial resistance from the fire establishment, which continued to argue that venting would feed the fire with oxygen and make it worse.

The fire brigades, however, were immediately supportive. Often firemen had to be sent up on to the roof of a burning building to cut holes in order to release the heat before the building could be entered to tackle the fire itself. The early venting of a fire removes the need for this dangerous operation and the risk of flashover; and fire officers immediately recognised the potential for saving firemens' lives.

Having sponsored a research project at the Fire Research Station which proved the value of fire ventilation, Colt continued throughout the late 1950s and the 1960s to spread the technology both in the UK and overseas.

Product testing under full-scale fire conditions is essential in order to make sure that Colt fire ventilators operate correctly. This rig in Kleve subjects units to fire, wind and rain.

The open-plan nature of modern car manufacturing plants means that smoke management has to be designed into the building from the start. Here, at Nissan in Tyne and Wear, Colt smoke-control systems are fitted throughout the assembly areas.

COLT INNOVATIONS 6

Project Jupiter

Project Jupiter is the name for the worldwide information technology system being installed by the Colt Group.

Historically, each company had developed its own computer system in order to support its business processes and accounting routines. As a result, a wide range of incompatible hardware and software existed.

In the late 1980s Colt had a unique window of opportunity when the IT systems in the United Kingdom, Holland and Germany all fell due for renewal. A global vision was developed that envisaged all of the group's IT systems working to a common protocol so that all parts of the operation would be able to communicate.

The basic requirements were for an 'open system', a common distributed database and standard software. Finding a software supplier capable of servicing such a system on a worldwide scale was difficult and so two were selected; one for the marketing programs and one to run the business processes of pre- and post-order management, office automation and accounting.

The project, which is an advanced one for a medium-sized group such as Colt, required a great deal of senior-level support and innovation to change the attitudes of management teams which were used to making local decisions with regard to IT. The competitive advantage of a global system will carry the Colt Group forward well into the next century.

Right: The OPV control panel and the Fireman's override panel *(above)*.

Control Systems: CCS 2000 and One Per Vent

A ventilation installation is only as good as the control system which operates it. In the days when Colt was largely concerned with solving problems in industrial buildings, manual and subsequently pneumatic controls were sufficient. Pneumatics allowed ventilators to be opened and closed at will. Their operation could be overridden to close any louvres when it rained or to open them in the case of fire.

With the advent of microprocessors and modern signalling techniques, Colt decided to incorporate these into its designs. Much of the development work was done in the group's German development laboratories in Kleve. The resulting suite of controls, called CCS 2000, allows heating and ventilation units to be switched on and off, or opened and closed, according to the detailed requirements of the scheme design. CCS 2000 is capable of controlling non-Colt equipment and of communicating with a fire security or a building management system. A central computer can be programmed to display the status of every part of the installation and the individual components can be switched by the click of a mouse.

Childrens World at West Quay Retail Park, Southampton is equipped with Colt Seefire natural louvred ventilators and a fixed smoke curtain. The smoke ventilation is controlled by the OPV system. The architects were BDP and Geoffrey Reid Associates.

The One Per Vent system has been developed by Colt International Ltd in the United Kingdom. One Per Vent puts a microprocessor and a rechargeable battery into every Colt ventilation unit and connects them together by a signal cable. This allows each ventilator to be treated as an intelligent element of a more complex system and to be given its own logic to follow. As a result, the designer has unlimited power to program the system to achieve the desired specification, including building in fail-safe strategies to deal with any foreseeable emergency.

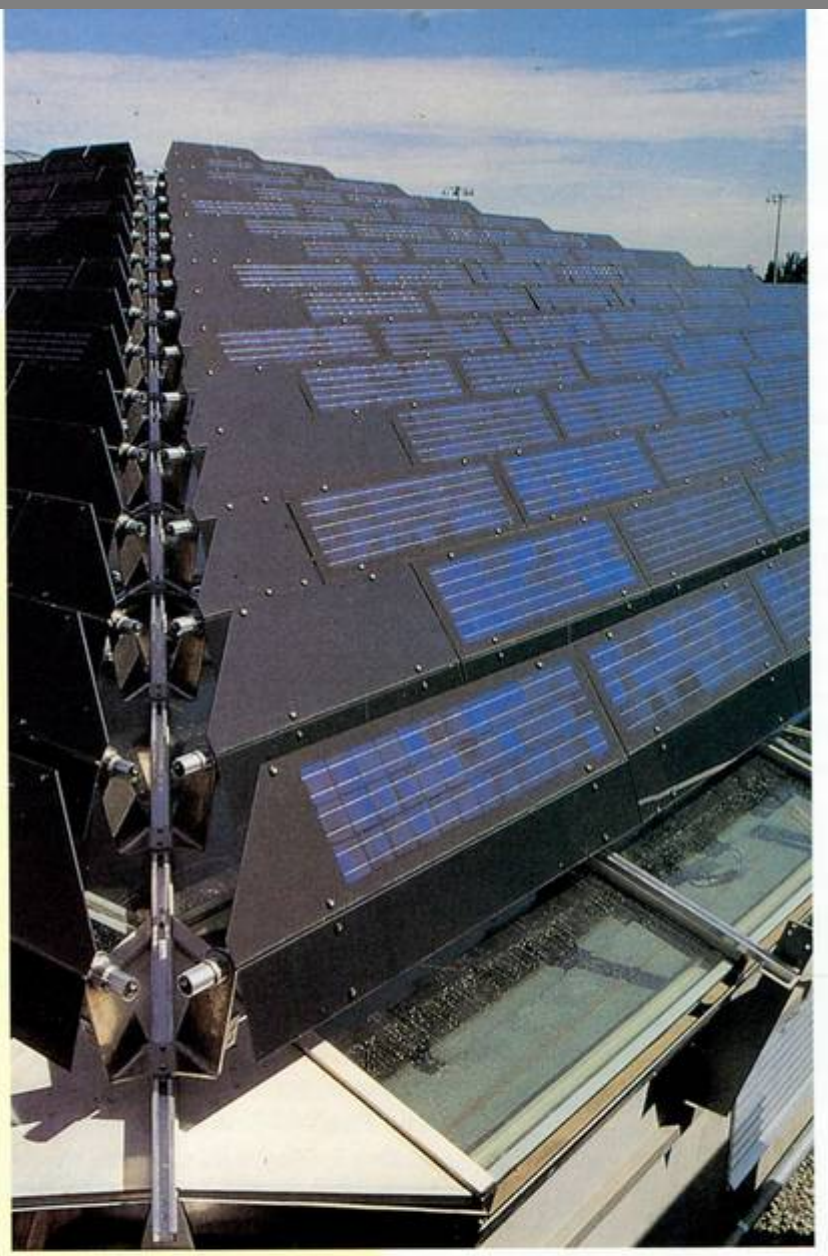
COLT INNOVATIONS 8

Renewable Energy

Photovoltaic cells convert the energy from the sun's rays into electricity. This system turns the sun into a renewable source of fuel and the resulting power can be used to reduce the demand for fossil fuels.

Colt employs advanced solar shading systems using sun-tracking glass louvres in order to cut down on solar heat gain and to add to natural daylighting by reflection. This in itself cuts the requirement for electrical power by reducing the demand for air-conditioning and for artificial lighting.

Colt has taken the further innovative step of combining the two technologies to produce Shadovoltaic Wings. In this system, the photovoltaic cells are mounted on the louvres. The investment gives better value for money due to the dual purpose design. In addition, the power output from the photovoltaic cells is higher than in a fixed system because the control system ensures that the louvres carrying the cells move to face the sun during the day.



The installation of Colt Shadovoltaic Wings at the Digital Equipment Corporation Heaquarters in Geneva can generate up to 16,000 kWh of electricity per year. The architects were Lecouturier-Caduff of Geneva.