

## Davy Corporation Limited

5.1. The Davy group is the largest United Kingdom process plant contractor and its engineering and construction (E & C) side is unique among the British-owned companies in this field in its range of processes and overseas markets. It also had substantial engineering and manufacturing (E & M) interests. There are some 70 subsidiary companies and 11 associated companies. A company structure chart is reproduced as Appendix 10. We have been informed that Davy is the largest European steel plant contractor and, in terms of world-wide contracting staff, is significantly bigger than the next two biggest European-owned process plant contractors put together. There are some 19,000 Davy employees of whom about 9,000 are in the United Kingdom and about 5,000 are engaged in manufacturing, predominantly in the United Kingdom. Some 80 per cent of revenues are earned outside the United Kingdom. As at June 1981, contracts were being executed in 42 countries.

### History

5.2. Davy was founded by the Davy brothers in 1830 as a mechanical engineering business. It became pre-eminent in the manufacture of steel mills and forging plant in the latter part of the nineteenth century. In the period prior to 1960, Davy designed, manufactured, supplied and commissioned such plants in many parts of the world, this activity culminating in the construction in 1956 of a £120 million integrated iron and steel works at Durgapur (India) by a consortium of 14 British companies in which Davy management played a leading part. The difficulties of managing that consortium convinced Davy that it needed to acquire the capacity to construct, as well as manufacture, iron and steel making plants in order to give itself the ability to build integrated iron and steel works. This led Davy to acquire, in 1960, The Powergas Group, one of whose members was Ashmore, Benson, Pease & Co, the leading constructor of iron-making plants in the United Kingdom. That acquisition also took Davy into a broader field of process plant construction because the other activities of the Powergas Group were primarily in the engineering and construction of town gas plants and chemical, petro-chemical and fertiliser plants.

5.3. In extending the range of its E & C activities in the late 1960s, Davy took a £25 million contract to build an oil refinery on the River Humber for Conoco. For many reasons this contract incurred a substantial loss. The experience resulted in a almost complete change in the top management team, and a re-appraisal of the company's objectives. The aim was to become a leading international force capable of the management of major projects across a broad spectrum of process technology in the main markets of the world. To achieve this extension of the technological and geographical range, the United Kingdom establishment was extended and partners were sought over 1970-73 in the two major centres of E & C business outside the United Kingdom, namely the Federal Republic of Germany (Bamag Verfahrenstechnik,

Zimmer AG and Chemiebau Dr A Zieren) and the United States of America (Wellman-Lord Inc of Lakeland, Florida and Olsen Engineering Corporation of Houston, Texas). Over the next few years co-operation and discussion with the McKee Corporation of Cleveland led to a merger between that company and Davy in 1978. McKee was a long-established United States engineering and construction company, with 20 offices world-wide and 5,000 employees, engaged in a diversified range of process plant projects in the same kind of business as Davy.

5.4. Davy today has operating companies in Australia, Argentina, Belgium, Brazil, Canada, India, Mexico and South Africa and representative offices in Bogota, Caracas, Kuwait, Mexico City, Manila, Moscow, Paris, Santiago, Singapore and Tokyo. The Davy McKee name was adopted in many parts of the organisation. With the merger with McKee, the objective of creating a major E & C organisation, capable of competing for all types of process plant contracts, was achieved.

5.5. In the United Kingdom, as a result of restructuring, an iron and steel plant engineering and construction division was formed, based in Stockton; rolling mills and heavy machinery engineering, manufacture and construction were centred on Sheffield, with specialist units in Poole and Bedford. Iron and steel roll manufacture became a discrete activity in Sheffield and Gateshead. A major investment programme for the Darnall works of Davy-Loewy in Sheffield was put in train.

5.6. In 1974, a proposal<sup>1</sup> for a merger between Davy International Ltd, as the company was then called, and the British Rollmakers Corporation Ltd (BRC), was put forward on several grounds, one of which was that the additional assets of BRC would strengthen Davy's assets base and so enable it to undertake more and larger process plant contracts in the future. The merger was found by this Commission to be expected to operate against the public interest. However, in 1977 Davy's strength in engineering and manufacture was enhanced by the addition of the resources of Head Wrightson and Herbert Morris, both of which voluntarily joined Davy in agreed mergers. Head Wrightson, which contributed engineering and construction experience and capability notably in the fields of nuclear energy and coal processing, added extra manufacturing facilities in steel founding, forging machinery and, in works on Teesside and in Manchester, high quality steel fabrications for process plant such as pressure vessels, refining and distillation columns (some as big as 200 feet long and around 250 tons in weight), large heat exchangers and the like. Herbert Morris,<sup>2</sup> with several active subsidiary companies, is the leading British company specialising in the manufacture of overhead cranes, a wide range of other lifting gear and mechanical handling systems. The activities of its subsidiary companies include the engineering of monorail systems, extensive crane servicing and maintenance facilities, and the manufacture of linear motors.

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<sup>1</sup> For further details see the report by this Commission on the proposed merger (HC 67, 1974).

<sup>2</sup> For details of Herbert Morris Ltd, see reports by this Commission on existing and proposed mergers with Amalgamated Industrials Ltd (HC 434, 1976) and Babcock and Wilcox Ltd (HC 175, 1977).



illustrated its abilities in carrying out major E & C projects by reference to certain large-scale contracts completed or in course of completion in recent years, namely:

- (i) the construction of an integrated iron and steel works for AHMSA in Mexico (£70 million);
- (ii) a \$1 billion contract secured by a European consortium led by Davy for the construction of an integrated iron and steel works for Acominas<sup>1</sup> in Brazil;
- (iii) the construction of the world's two largest methanol plants in the USSR, under contracts worth £175 million in total;
- (iv) the construction of a \$380 million large cold rolling mill complex at Smederevo, Yugoslavia; and
- (v) the construction of a refinery for Texaco on a green field site at Nanticoke, Ontario, Canada (\$430 million).

Other projects included an energy-saving programme for a major refiner which will require a total re-working of one of the refineries in the United States of America at a cost of \$1 billion.

5.10. The main E & C groupings form what may be broadly described as operating units. On the steelplant and non-ferrous metals side there are Davy-Loewy, Davy McKee (Minerals and Metals) and Loewy Robertson. On the energy and chemicals side there are Davy McKee (Oil and Chemicals) in the United Kingdom and Davy McKee AG and the United States Davy McKee companies overseas. Davy Corporation itself does not put in bids but is concerned with the choice of operating centre to do so (depending on the source of the technology and the availability of resources, the scale and nature of the job to be performed, as well as on political and financial considerations). As we explain in paragraph 5.16, a good deal of the initiative in the Davy organisation is left to operating management, although final decisions on whether to bid for large contracts are taken at the centre.

5.11. The scope of the work performed by Davy varies from, at one end of the range, a feasibility study or preliminary design, not involving large expenditures, to a complete operation including the process engineering calculations, detailed design, procuring of supplies, construction and commissioning running into sums well over a hundred million pounds, at the other. Davy, as we have seen, is capable of carrying out the whole of a major project or such specific parts as the customer may require. Some clients split the contract into separate packages for technical, financial or political reasons. In addition, clients may prefer to organise the labour and construction themselves and look to the contractor to supply the process engineering, design engineering, supply of plant and supervision of its erection or simply to arrange the supply and construction of plant of other variants and combinations of services. Complete projects and many schemes involving more limited segments of the work figure among the 1,500 Davy contracts referred to in paragraph 5.9. Davy told us that the very largest contracts were increasingly being divided between a number of contractors or were carried out on a reimbursable basis (see paragraph 3.18).

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<sup>1</sup> The value of the exported equipment was approximately \$500 million from the United Kingdom and \$250 million each from France and Germany.

5.12. The payment terms in Davy's contracts are totally or partly reimbursable or on a fixed or firm price basis (see paragraph 3.19). Figures of contracts over £5 million completed in 1979 and 1980 or still in hand at the end of 1980 showed that approximately half of the total value was made up of reimbursable contracts and half was on a lump sum basis; the former half consisted of United States operations, over 90 per cent of which were on a reimbursable basis, and the latter those of the United Kingdom and German companies, over 90 per cent of which were on a lump sum basis. Davy told us that it was a feature of its Contract Acceptance Policy (see paragraph 5.19) to try to avoid fixed prices on construction work, particularly where there was a large local labour element, or where the process was relatively new.

### Technology

5.13. Davy explained that its success was founded on its technical capability generally and on the range of processes which it was able to offer. These processes had been acquired both by licences from other process owners (of which Davy holds over 150 over the broad range of its chemical and metallurgical activity) and by the creation of new processes and developments as a result of Davy's own research and development work. Often the licensed processes had depended for their success on Davy's development and technical adaptation to increase the process efficiency or to suit the process to special client conditions. Typical instances were phosphoric acid and phosphate fertilisers (Davy-designed plant accounts for more than half the world phosphoric acid plant capacity), methanol (Davy plants are responsible for 55 per cent of the total world production and 75 per cent of plants using the ICI low pressure process) and phthalic anhydride (Davy improved the Von Heyden process using a new low energy process route and has built 80 per cent of all Von Heyden process plants). On the metals side, Davy used licences from Japan, Germany and the United States of America and has built up co-operatively with British Steel Corporation over a number of years a full range of iron and steel making and forming processes and detailed designs covering steel manufacture from ore preparation to metal finishing.

5.14. Examples of technology created by Davy's own research and development work were: plasticiser alcohols, continuous ion exchange for the recovery of uranium, fluid bed gasification of coal or biomass (Winkler process). Davy also instanced horizontal continuous casting, which stands out among many developments in steel manufacture, and its automatic gauge control system for rolling mills. Among important developments in non-ferrous mills was Davy's Vidiplan method of controlling quality and thickness.

5.15. Other developments on the contracting side include computer aided design and the use of interactive<sup>1</sup> computer systems for project control. On the manufacturing side, after rationalisation in the late 1960s and 1970s, Davy now possesses two large works which contribute hardware to its contracting side as well as manufacturing for direct sale—Davy-Loewy, Sheffield (which

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<sup>1</sup> Intermediate input by keyboard operators is eliminated and all material fed directly into the computer by engineers or commercial officers.

is an integral part of the engineering and construction business) and Head Wrightson, Teesdale (which is classed as an engineering and manufacturing company). Davy-Loewy is almost the last remaining manufacturer of ferrous and non-ferrous rolling mills in this country and has one of the few works where 300 ton castings can be machined with great accuracy. It has an active programme whereby old machine tools are being replaced by the latest numerically controlled machine tools, the tapes for which are prepared in the computer-aided draughting system by means of a direct link to the planning facility. Head Wrightson, Teesdale, the speciality of which is fabrication of thick plate to exacting standards, is also being re-equipped, but the process has much further to go. However, it is intended shortly to improve facilities so that fabrications of up to 4,000 tons can be shipped in one piece.

### **Management**

5.16. Davy is organised to encourage the responsiveness and initiative of line management which is given freedom to develop new business. There is no corporate planning department since formal planning procedures are regarded as inappropriate for a business like Davy's. What is sought after is the pursuit of simply stated objectives by senior management in an entrepreneurial way. Major contract events are reported in a continuous flow by the principal executives as and when the events occur. This flow of important information is supported by quarterly forecasts from operating companies based on up-dated annual profit forecasts with full supporting information such as cash flow data necessary for the complete understanding of the progress of the operating unit concerned. Overall planning and policy formulation is undertaken by the principal executives who meet for the purpose. While considerable initiative is left to local and specialised companies and groupings, Davy seeks to conduct its E & C activities as an integrated organisation under the broad direction of the Davy McKee International Management Board. In addition to the Chairman (Sir John Buckley) and Managing Director (Mr R J Withers) of Davy Corporation and the finance and administrative heads, this body includes the five senior executives, one of whom is the head of the United States companies, responsible for the whole range of process plant contracting. Three of the chief executives have each a discrete line responsibility and an industry-based co-ordination function. Major contracts are carried out by a specially formed task force of all the relevant skills within the organisation and normally a full-time project director will be appointed by the operating company to oversee the contract.

5.17. Davy believes that much of its success depends on the relationship between the key management personnel involved in the sequence of decision-making leading up to contract acceptance, the negotiator being given as much freedom of action as possible consistent with a proper appreciation of the risks in a contract at an appropriate level in the organisation. Risk is a crucial feature of contracting operations, particularly with lump sum contracts. Especially in the light of its 1969 experience referred to in paragraph 5.3, Davy is concerned to devote particular attention to the management of risk and explained to us in detail the steps they took, in addition to ECGD and other insurance, to ensure that available financial resources were continuously adequate to meet foreseeable requirements or adverse developments that could not be ruled out as contracts progressed.

5.18. These arrangements include a cash control system that provides a cash forecast over the next three years which shows the position at quarterly intervals and is reviewed quarterly. The forecasts are produced by operational management and they enable senior management to assess the impact of risks and uncertainties on the medium-term future of the company, to identify changes in the company's position at an early stage and to keep under review the assumptions on which the estimated cash flow is based. These assumptions, which relate mainly to the obtaining of new contracts and to the results of existing contracts, are made on a consistently cautious basis. In the course of carrying out the quarterly review of Davy's future cash position, management superimposes on these conservative cash forecasts a further range of assumptions (again provided by operational management) reflecting a range of possible deviations, both positive and negative, from each unit's forecast. The forecasts are used both to identify areas for management action and as a means of ensuring the adequacy of Davy's cash resources.

5.19. The risk on individual contracts at the bidding stage is controlled throughout the organisation by a Contract Acceptance Policy. This reflects the experience of the company, condensed into a set of rules and principles, in terms applicable to any project and includes mandatory provisions as well as providing rules for the general guidance of negotiators. Davy gave us a full account of this system, the salient features of which are detailed and accurate estimates by experienced staff including the obtaining of prices from suppliers and sub-contractors based on firm data, and, wherever possible, on a 'back to back' basis (ie liabilities to the customer matched by undertakings from the supplier) and also skilled contract negotiation, involving the inclusion of escalation clauses, limited liability clauses and terms of payment which will ensure the reasonable financing of work in progress. Projects over £30 million go to the Davy Managing Director in consultation with the Chairman and projects selected from these to the main board which, as Davy indicated, includes non-executive directors with highly relevant experience. The exposure to risk during the execution stage is controlled by project management of contract cost and contract scope variations.

### **Purchases of United Kingdom products**

5.20. Davy pointed out that on average about 95 per cent of the hardware orders supplied under contracts taken by Davy from a United Kingdom operating centre were in fact supplied from the United Kingdom (see Table 3.3). In the years ended 31 March 1980 and 1981, goods and services supplied by and through Davy as exports from the United Kingdom totalled £229 million and £199 million respectively. Orders supplied under contracts taken from a Davy operating centre in the United States of America or Germany are largely procured in those countries. Further details are set out in Appendix 12.

### **Financial information**

5.21. In the year ended 31 March 1981 Davy earned profits before tax of £18.7 million on world-wide turnover of £670.9 million. The summarised profit and loss accounts, balance sheets and sources and application of funds of Davy, prepared on an historical cost basis, for the five years ended 31 March 1981 are set out in Appendices 13, 14 and 15 respectively.

5.22. A breakdown of the group's turnover and profits between the engineering and construction and the engineering and manufacturing segments, showing that the bulk of turnover and profit is provided by the former activity, is as follows:

TABLE 5.2  
Years ended 31 March

	1979		1980		1981	
	£m	% of total turnover	£m	% of total turnover	£m	% of total turnover
<i>Turnover</i>						
Davy McKee engineering and construction						
UK companies	275	45	265	35	230	34
US, German and other companies	245	40	398	53	359	54
	<u>520</u>	<u>85</u>	<u>663</u>	<u>88</u>	<u>589</u>	<u>88</u>
Engineering and manufacturing	91	15	89	12	82	12
	<u>611</u>	<u>100</u>	<u>752</u>	<u>100</u>	<u>671</u>	<u>100</u>
		% of related turnover		% of related turnover		% of related turnover
<i>Profit</i>						
Davy McKee engineering and construction						
UK companies	24	9	18	7	17	7
US, German and other companies	5	2	7	2	12	3
	<u>29</u>	<u>6</u>	<u>25</u>	<u>4</u>	<u>29</u>	<u>5</u>
Engineering and manufacturing	(1)	(1)	(1)	(1)	(1)	(1)
Unallocated central costs—mainly financial charges	(2)		(8)		(9)	
	<u>26</u>	<u>4</u>	<u>16</u>	<u>2</u>	<u>19</u>	<u>3</u>
Profit before tax						

The profits before tax from the engineering and construction activities over the five year period 1977–81 showed increases until 1979–80. The principal reasons for the reduction in profits in 1980 are said to be the engineers' strike in the United Kingdom, losses suffered on several contracts carried out by the Olsen construction company in the United States and generally adverse trading conditions. Some recovery has been achieved in 1980–81 and Davy is confident that the position will improve further in the future. On the manufacturing side the market has been depressed and losses have been suffered but a substantial restructuring and slimming down of these operations has been carried out in line with what Davy considers to be a more realistic view of the long-term size of its potential market.

5.23. In accordance with the provisions of SSAP16<sup>1</sup> Davy has also prepared accounts under the current cost convention. In the year ended 31 March 1981 Davy earned an operating profit before tax on current cost basis of

<sup>1</sup> Statement of Standard Accounting Practice issued by the major accounting bodies.

£16.5 million (1979–80 £14.2 million) on turnover of £670.9 million (1979–80 £752.4 million). The difference from the results on the historical cost basis is mainly due to the adjustment made to charge against profits the depreciation of fixed assets used in the business on the current cost instead of the historical cost basis. Adjustments for cost of sales and monetary working capital cancel out because stocks and work in progress are fully financed by net monetary liabilities consisting of creditors less debtors, work in progress not subject to the cost of sales adjustment and that part of the bank balances assumed to be required for working capital.

5.24. The statement of source and application of funds shows that a large part of the resources used to expand the business has been funded from profits generated by the business. A departure from this pattern was the acquisition in 1978–79 of the McKee group of companies operating from the United States. It was decided that half of the purchase consideration should be financed from borrowed funds and, accordingly, loan facilities totalling \$104 million were arranged with several banks to be available for periods ranging from five to eight years. Although the full amount of the facility was initially used, a significant part was soon repaid and at 31 March 1979 aggregate group loans had increased to no more than £32 million from the £6 million at the previous balance sheet date. There has been little movement since as the overall loans outstanding at 31 March 1981 stood at £33 million.

5.25. The increase in the net worth of the Davy group as represented by share capital and reserves, deferred tax and Government grants, less goodwill is as set out in Appendix 16.

5.26. Davy management accounting is based on forecasts of profits for the current year which are reviewed quarterly throughout the year. Forecasts are also prepared, again on a quarterly basis, covering periods up to two further years ahead. In these, attention is paid particularly to the forecast cash positions (see paragraph 5.18). All forecasts are built up from reports from every operating unit within the group and take account of the forecast profitability of uncompleted contracts, the impact on workload within the forecast period of contracts not yet obtained and the other cash effects of these contracts. Profit estimates tend to be conservative.

5.27. The considerable importance attached by management to the tight control of Davy's cash resources is described in paragraph 5.18. Cash is controlled centrally and there are arrangements for daily bank clearances to group central accounts so that the investment of cash can be properly managed. The central investment of cash causes an appropriate credit or charge to each operating company within the group dependent upon whether a company has been a net provider or user of central funds during the year. This procedure helps Davy to maintain a strong liquid position on which it places great emphasis. It is also claimed that it maximises the confidence of clients and Davy's own flexibility. Cash, net of short-term borrowings, has grown to £69 million in 1981 as compared with £9 million in 1975. In addition to its cash resources Davy has unused borrowing facilities of about £50 million in excess of existing borrowing.

5.28. Davy operates in many countries and in various currencies. It does not accept any significant currency risks in its trading operations and it eliminates such risks by matching its income and expenditure in each currency. On occasions this requires the use of forward exchange markets. The company holds its net assets in several hard currencies with the aim of protecting the net worth from the effects of an exceptional movement in any one currency.

5.29. We examined Davy's procedure for the authorisation of capital expenditure. Before the start of each financial year companies within the group submit their capital expenditure budgets for approval. These budget proposals are studied in depth at the centre and authorised in broad outline in a total amount by the central Davy Board and the individual operating companies are given a figure within which they have to work. Progress against budget is vetted on a quarterly basis and everything above a cost of £10,000 goes through a process of sanction within the total and authorisation of the separate items. Below a figure of £10,000 there is an authorisation to proceed without that kind of detailed authorisation.

5.30. The internal audit programme and procedures were discussed with Davy management. The number of staff engaged in this function is seven in the United Kingdom and seven in the United States/Argentina. In addition to work on the usual financial checks and internal control routines they also examine the application of computer security safeguards in relation to the requirements laid down in Davy's Computer Security Standards Manual. The audit section has a good working relationship with the joint external auditors who see all the reports prepared by them.

5.31. We contacted Davy's joint external auditors to obtain their views on the general effectiveness of the internal audit procedures, and for their comments on the work of the internal audit departments. In relation to the financial and systems internal audit, it was the opinion of the external auditors that Davy's techniques of internal control were generally appropriate to the circumstances of each company in the group and that they were adequately enforced. The regular internal audit scrutiny is relied upon as part of the overall audit process and, additionally, we were told that when internal audit staff were available they carried out some work under the direction of the external auditors and the relevant working papers were incorporated into the audit files.