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THE COST OF POWER: COSTING PROCEDURES AT THE SOHO FOUNDRY

by

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Abstract

The Soho Foundry, managed by James Watt jnr was an innovative manufacturer of steam engines, in the late eighteenth and early nineteenth centuries. This paper discusses the establishment of the foundry and the costs accumulated and recorded to assist in the management of the organisation. The costing records were very comprehensive and served to set prices as well as to determine profit on each order.

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THE COST OF POWER: COSTING PROCEDURES AT THE SOHO FOUNDRY

Introduction

Cost was an important consideration for the manufacturers of the late eighteenth century just as it is for the manufacturers of the late twentieth century. The owners of the Soho Foundry of Birmingham were no exception. It is the aim of this paper to provide insights into the costing procedures used at the Soho Foundry to assist in the manufacture and sale of steam engines.

The Steam Engine Business

The original partnership of Boulton and Watt, formed in 1775 was established to act as consulting engineers in the erection of steam engines [Roll, 1930; Dickenson, 1935; Tann, 1981; Law, 1990]. The steam engine developed by James Watt was more efficient and economical than the other engines then available. As most of the engine parts were made by subcontractors, Matthew Boulton and James Watt selected appropriate specialists for particular pieces, and because of a concern for the firm's reputation these subcontractors were selected more on the basis of the quality of their work than cost [Tann, 1981]. However as time went by, in order to maintain the high quality of the product, more and more parts were made in Boulton's Soho Manufactory, until by the early 1790's over 50% of the value of the engines was made by the partners [Tann, 1981]. The nature of the business was changing as well, with customers being more interested in purchasing a complete engine rather than being bothered with the close involvement in its construction that had been necessary to this point [Dickenson, 1936]. Other incentives that inclined the partners towards manufacture in their own right included the attraction of a greater share of the profits, hitherto being taken by the sub-contractors. There were problems too with quality control and lack of standardisation, together with the difficulties in coordinating the sub-contractors [Tann, 1981]. Sub-contracting did have some benefits though. The major one being that all the engines were custom built and the sub-contractors bore a large part of the risk.

By late 1794 Boulton and Watt had come to the view that they would have to manufacture complete steam engines and not depend on subcontractors. In October a new partnership under the name of Boulton, Watt & Sons was formed [Roll, 1930; Dickenson, 1935; Tann, 1981]. The partners were Matthew Boulton and his son Matthew Robinson Boulton, James Watt and his sons James Watt jnr and Gregory Watt[1]. The purpose of the new partnership was the manufacture of steam engines, thus completing Boulton's promise of 1769 to build a factory for this purpose [Dickenson, 1935; Tann, 1978]. Roll [1930] suggests four reasons for the establishment of the factory, to be known as the Soho Foundry, in 1795:

1. The steam engine patent as extended by the Act of 1775 was due to expire in 1800 and the mounting incidences of piracy of their engine design indicated that there would be intense competition after the monopoly was removed. This impending competition meant that the firm would have to concentrate on efficient methods of production and competitiveness.

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[1] Gregory Watt (1777-1804) was a half-brother to James jnr. Always suffering poor health, he died of consumption at the age of 27 [Rolt, 1962].

2. Success had ensured an adequate supply of capital to finance a new production facility. There was also available a pool of workmen skilled in the production of the various parts of steam engines.
3. Matthew Boulton was 66 years old and James Watt was 58 and both, wishing to pursue other interests, were ready to hand over to their sons.
4. Perhaps the most immediate reason was the disagreement between John Wilkinson and his brother William[2] resulting in a court order to close the Bersham Ironworks, a situation which was potentially disastrous as Wilkinson was the major supplier of cast iron cylinders and other castings. Other foundries[3] could not match the quality of Wilkinson's work.

There was no formal legal agreement for the establishment of the 1794 partnership so it is not possible to determine how it was intended to operate [Gale, 1962]. It is obvious from the way that the business was conducted that the sons were to be given freedom in their management of this new direction. The elder Watt was not involved apart from advancing finance to buy land and giving advice, he being more concerned with his scientific pursuits [Dickenson, 1935]. Once the new partnership had been formed the first step of note

> ... was to decide on the building of a completely new works solely for the manufacture of engines and, having decided, to set about the task with a speed and energy which was entirely characteristic of the younger partners. It was a most important decision. Engines had, of

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[2] Matthew Robinson Boulton married William Wilkinson's daughter. William Wilkinson gave advice on the setting up of Soho Foundry [Roll, 1930; Rolt, 1962; Gale, 1962].

[3] Cylinders cast and bored by the Coalbrookedale Company were reasonably satisfactory but they were unable to meet the demand and cylinders produced elsewhere were unsatisfactory [Rolt, 1962].

> course, been built for years, both by Boulton and Watt and latterly by numerous others, but nobody had, so far, put down a factory designed, built and equipped with that one end in view. Here, then, was a new conception. It could reasonably be called the world's first purely engineering works.
>
> [Gale, 1962, p. 76]

Soho Foundry

The name given to the new works was the Soho Foundry and it was intended from the outset to be run as a separate business by Matthew Robinson Boulton, James Watt jnr, and Gregory Watt. The opening of the foundry meant that they would be complete engine manufacturers. Construction began in 1795 and was complete in 1796 [Roll, 1930; Dickenson, 1935; Gale, 1962; Tann, 1981].

The Foundry was sited on 18½ acres in Smethwick, next to the Birmingham and Wolverhampton Canal. The layout of the works received close attention being designed to take advantage of the natural fall in the land. Following the advice of experienced engineers such as Peter Ewart and William Wilkinson the buildings were "extensive and included a foundry with air furnace and core-drying kiln, forging shop, smith's shop, boring mill, turning shop, fitting shop and carpenter's shop" [Rolt, 1962, p 119]. This establishment was important because it was the first facility ever built for the purpose of building steam engines and offered greater efficiency of production over other manufactories that had been adapted for the purpose. The Soho Foundry was a product of remarkable skill and foresight [Gale, 1962].

The buildings were designed to take account of the natural fall in the land which assisted in the removal of the cylinders from the casting pit down a slope to the boring mill "(h)ere was a natural flow-line process, with no unnecessary material movement, in 1795!" [Gale, 1962, p 79]. Similar attention was paid to the siting of the other items of equipment and ancillary buildings, with the aim of achieving efficient production.

The foresight and planning that had gone into the building of the Soho Foundry is evident from a description of the Foundry by Shaw in his *History of Staffordshire* (1798-1801) who observed that

> ... Messers. Boulton & Watt found it necessary to erect and establish an iron foundery for that purpose [manufacture of steam engines] and they have accordingly in partnership with their sons (to whose activity, genius, and judgement it must be attributed, that this great work was begun and finished in the course of three winter months) erected at a convenient place and contiguous to the same stream at Smethwick a great and complete manufactory and foundery into which a branch from the Birmingham Canal enters and thereby the coals, pig iron, bricks, sand, &c. are brought and their engines or other heavy goods are transported to every part of the kingdom, their being a wet dock within their walls for four boats to lie.
>
> [quoted in Roll, 1930, p 161]

The Soho Foundry was opened in January 1796, an occasion celebrated by a luncheon for 200 guests [Roll, 1930; Rolt, 1962]. Many former Bersham employees were engaged to work in the new factory including Abraham Storey who was appointed the foundry foreman [Dickenson, 1935; Rolt, 1962]. The new factory did not manufacture all of the engines that the firm sold as the records indicate that Boulton's Soho Manufactory continued to assemble engines and make parts of engines for a number of years even though the Soho Foundry was manufacturing complete engines.

In its first year of operation the Soho Foundry accepted orders for 31 engines and by 1800 had produced 169 engines [Tann, 1981].

Matthew Robinson Boulton seems to have been very much involved in the initial planning for the Foundry while James Watt jnr, judging from the amount of calculations and costings in his handwriting, seems to have been more concerned with the daily organisation and running of the business [Dickenson, 1936]. In a letter to a friend on 14 April 1797, Matthew Robinson Boulton said:

> You will (not be a) little surprised to find that I am a very regular attendant in the counting house & immersed in business. Like a person hesitating on the brink of a cold bath I found that the only means of conquering my aversion was to plunge in; my experiment has so far succeeded. Mr. J.W. jun^{r}. & myself with the occasional advice of the old gentlemen have the entire Management of the Engine business & for the last 12 mos. I have not had respite from it as you will judge from the epitome of our labours.
>
> [Tann, 1981, p 235]

The Organisation of the Soho Foundry

The Soho Foundry had three main operating departments. The Foundry Department was responsible for the casting of engine parts, the Smithy Department was responsible for the manufacture of parts from wrought iron and the Fitting Department was responsible for machining the parts and fitting the engine together. As mentioned above, engines continued to be built at the Manufactory, with the products of both establishments being sold by the one organisation, however, the records make a distinction between the products of each. The Soho Foundry was operated as an independent entity and was expected to make a profit; as were each of its operating departments which were treated as profit centres.

Costing Records

Considerable attention was paid to cost, one of the reasons being that cost generally formed the basis of prices. In the early years of the Foundry, and indeed at the Manufactory during the same period, the steam engine business became subject to increasing competition with increasing downward pressure on prices. This is borne out by the large amount of correspondence between the partners on the subject of price setting. Increasing sales of not quite standard products also necessitated an efficient cost recording system if the partners hoped to remain in control of their business and to be in a position of being able to determine the profit on individual contracts. The cost of each individual engine made was calculated in the Engine Book.

The Engine Book

The engine books are large books consisting of a printed list of all the parts required by an engine under the headings Cast Iron, Wrought Iron, Brass, Miscellaneous and Fitting. The cast iron was supplied by the Foundry Department, the wrought iron by the Smithy Department and the Fitting Department put it all together. Other materials such as brass work were obtained elsewhere. The list is very detailed and it appears that standard rates were used for the various parts that were standard items for an engine of that size. The following extracts come from the Engine Book for the period

1797 - 1805 and relates to a 14 Horse engine supplied to Peter Drinkwater, a Manchester cotton spinner on 22nd October 1799, it is to be noted that weight was recorded as hundredweights, quarters and pounds:

No.					
	Cast Iron				
1	Cylinder 20¾	14, 2,25			
	Bottom	3, 3, 3			
	Lid & Gland	3, 2, 3			
2	Piston and Core	3, 3, 6			
3	Air Pump & Bottom Plate	6, 3,13			
	Lid and Gland	1, ,12			
	Bucket	3,15			
4	Hot water pump and door	3,20			
5	Cold water pump and door	3, 2, 7	39, ,20	30/-	58.15.4½
6	Cover for the Cylinder Lid	2,25			
7	Steam Case in 6 Pieces	8, 2, 7			
8	Dogs for holding down the Cylinder	2, 4			
9	Ditto for holding down the Air Pump	2, 2			
10	False Face	1,10			
11	Cover for the Foot Valve	2, 6			
12	Upper Nozzles) & Slide pipes in one piece				
	6 Bonnets 4 Valve Keepers	1, 0, 2	12, ,18	18/8	11. 7. -
	Under ditto) 4 Wedges & Plates for Cross Head				

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	Wrought Iron		
41	Cylinder		
	3 Steady pins in the Top Flanch	6^d	1. 6
	2 Screw Pins, Nuts &c for Stuffing Box		7
	7 Screw Pins for Cover of Lid	4^d	2. 4
	2 Screwed Bolts, Nuts &c for holding it down		3, 6½
	18 Screw Pins, Nuts &c for Joints		2, 7½
42	Steam Case		
	11 Pins, Nuts and Washers	7^d	6. 5
	26 Ditto Ditto for Side Joints	7^d	15. 2

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61	Governor			
	Iron Work	2,18		
62	Rod for Cistern Valve	7(lb)	10^d	5.10
63	Pins, Nuts, and washers for Joints			
	12 Inch ditto ditto	25		

		8, ,23½	7^d	26.16. 4½

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Brass

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81	2 Throttle Pipe Brass Collers		, 1,12		
	1 Copper valve for ditto	, 1, 4	2, 3,13, 6	19^{d}	25. 8.10

82	Injection Cock		18	24^{d}	1.11. 6
83	Blowing Valve 3½ Inches				16. 3

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Miscellaneous

92	Leather for Valves	5 -	
95	1 Box Pomatum 26lb	1. 6 -	
96	1½ Boxes Cement	3. 3	£ 4.14

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Fitting

Cylinder and Parts belonging to it

102	Cylinder Drilling	10. 6	
	Facing ditto	1.	
	Boring out the Stuffing Box and Gland	17. 6	
	Turning and fitting the Brasses	16. 0	
	Fitting Screws to the Gland and Cover to the lid	10. 6	
	Ditto steady pins in Top Flanch	5. 9	4. . 3

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Abstract

Cast Iron	134, - ,10	£139.12. 5
Wrought Iron	15, 1,10	70. 6. 3
Copper Brass &c	3, 21,14	33.15. 4
Stores		4.14
Patterns & Boxes		12.18. 6
Fitting		50.19
		-------------
		312. 5. 6
$Commiss^{n}$ on Amt of S[oho] F[oundry] Inv^{d}		301.11. 5
@ 2½ p^{r} Cent		7.16. 1

		£320. 1. 7

[B&W 231]

The above gives an indication of the amount of detail undertaken when working up an engine cost. It also shows the use of standard rates in the calculation of costs. For example, there were a number of castings required to produce the parts for the engine, necessitating several different methods of making the casting. The rates for casting were based on the weight of iron cast even though the actual cost of the individual casting may well have been different. The rates were 30/- per cwt, 18/8 per cwt, 18/- per cwt and 16/- per cwt[4]. The rates charged were probably based on an estimate selling price taking into consideration the material and labour content as well as the complexity of the casting. The standard rates for castings show an increase in 1800 and then appear to have remained constant for a number of years.

The Smithy used two methods of charging out its work, for most items there was a common charge of 7^{d} per pound weight, however some items had a fixed charge depending on what it was. The Fitting Department had a series of charges for each operation required to assemble the engine. Again these rates remain constant and are based on direct cost.

All the costs involved in the calculation of total cost were operating department costs and at this stage there was no allowance for general overheads. The commission was payable to the managers of the Foundry as part of their remuneration [Tann, 1981]. This particular engine had a computed cost of $320.1.7, and its actual selling price was £484.0.0 [B&W MII/7/2]. B&W MII/7/2 indicates that each engine was expected to return a profit of 25% based on the engine book cost, this particular engine more than achieved this goal with a gain of £163.18.5. However, not all engines returned 25% of engine book cost as the document illustrates with a listing of all engines shipped during the year showing the difference between the computed return and the profit as calculated by deducting the engine book cost from the selling price.

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[4] The 1797 Inventory [B&W 429] values Pig Iron at £6-10-0/ton to £7-9-0/ton.

An entry was made in the engine book for each engine manufactured with a costing of each part that was included in the engine based on standard prices. A more detailed record of actual costs was kept in the Fitting Book.

The Fitting Book

The Fitting Book gives a detailed breakdown of the time taken, and thus the cost, in fitting each part. Unlike the Engine Book the Fitting Book records the actual time and cost instead of the standard rate for the job. Like the Engine Book this book too is pre-printed and is very detailed including a charge calculated for the use of machinery and tools as well as labour. The extract that follows relates to a 14 Horse engine built for Hibbert & Smethurst of Oldham Lancs., completed on 29th January 1801:

Hibbert & Smethurst 14 Horse

	Days	Charge of mens time	Amount of Mens Time upon each Article	Charge included use of tools and Machinery	Amount with charge for Tools and Machinery upon each Article	Total Amt
Cylinder						
Cylinder Lid						
Facing						15.
Centering the Lid	¼	2/4	0. 0. 7			
Turning ditto	¾	2/4	0. 1. 9			
Drilling ditto	¼	2/4	0. 0. 7			
Boring out Stuffing Box	¾	2/8	0. 2. 0	10/-	0. 7. 6	
Boring the Gland	½	2/4	0. 1. 2	10/-	0. 5. 0	
	2½		£ 0. 6. 1			0. 12. 6
Turning and Fitting the Brasses						
Turning and boring brass bush for gland	½	2/8	0. 1. 4	8/-	0. 4. 0	
Turning and boring brass of stuffing box	½	2/8	0. 1. 4	8/-	0. 4. 0	
Turning the Gland itself	1	2/6	0. 2. 6	8/-	0. 8. 0	
Fitting the Bush into Gland	¼	1/10	0. 0. 5½	2/4	0. 0. 7	0.16. 7
	2¼		£ 0. 5. 7½			
Fitting Screws to Gland & Cover to Lid						
Drilling false cover &c	¼	2/4	0. 0. 7	8/-	0. 2. 0	
Fitting ditto to Lid	1¼	2/4	0. 2.11	2/10	0. 3. 6½	
Fitting Screws of the Gland	¼	2/4	0. 0. 7	2/10	0. 0. 8½	0. 6. 3

	1¾		£ 0. 4. 1			
Fitting Steady Pins in Top Flanch and Drilling Holes	1	2/8	0. 2. 8	3/2	0. 3. 2	0. 3. 2

[B&W 291]

The above shows a small section of the very great detail that the Fitting Books record. The men were paid according to the job that they did with the most common pay rates being 2/4 and 2/8 per day with time being recorded in increments of a quarter of a day. As well as giving an accurate account of the work of the Fitting Department this book provided data for comparison between different engines. There is no indication of the method by which the rate for the Tools and Machinery Charge was determined, nevertheless it shows an appreciation of the need to include these indirect costs.

Actual times and actual costs are shown in the Fitting Book and a comparison with the Engine Book for the same operations and the same engine yields the following:

	Fitting Book	**Engine Book**	**Difference**
Cylinder Lid			
Facing	15. 0	15. 0	
Centering/turning	2.11	3. 6	+ 7
Boring stuffing box & gland	15. 8	17. 6	+ 1.10
Turning and fitting the brasses	1. 2. 2½	16.	- 6. 2½
Fitting screws	10. 4	12	+ 1. 8
Fitting steady pins	5.10	5. 9	- 1

[B&W 291, B&W 232]

While there are many differences between the actual amount in the Fitting Book and the rate in the Engine Book there does not seem to be any record of these differences nor any action seem evident to resolve the differences and perhaps alter the rates. This may come to light with further research or it may well be that the records were kept to provide information only and operated as a check on the work done in the Department.

The costing records kept at the Foundry were supported by a set of subsidiary records [B&W 37/2] which recorded times and costs for all the operations and activities undertaken. The cost records were very detailed and the above extracts are a small example of this detail. As will be discussed later these cost records provided the basis for the prices charged for future engines and provided information for a number of calculations relating to piece rates to be paid to the employees.

Conclusion

The Soho Foundry was a new venture, designed from its inception to build steam engines, consequently the factory was built to ensure smooth and efficient working, a great achievement when it is considered there were no examples to use as a model. The factory that was built and staffed with dedicated, highly skilled and innovative people operated for many years. The Soho Foundry was designed to operate in the same way as its products. As a steam engine was designed to produce power, so too was the factory designed to produce steam engines smoothly and efficiently. As steam engines were designed to be self-governing so too the factory, accounting providing an essential part of this governance.

The accounting system was set up to reflect the organisation of production. It was designed around profit centres and recorded the flow of materials and work from one department to another. Because the Soho Foundry was a pioneering venture it is important not to judge workable solutions found to the problems that arose in the light of present knowledge and practice because of the differing contexts. The accounting processes extant at the Soho Foundry in its early years continued for many years so it is reasonable to assume that they supplied the perceived needs of that time. Certainly the number of documents showing calculations still in existence indicates that the accounting system provided a data base that was used by Watt in the managerial process, yet it does not appear to have been used to produce budgets or other forecasts.

Attention was paid to the profit centres, the Smithy, the Foundry and the Fitting Shop, because these were the main areas of activity in the organisation. Transfers between the profit centres were recorded and valued with a system of pre-determined costs being used to assign values to the products and materials transferred. The system used cost rates that did not appear to change very much over time. The rates were determined by activity and in the Foundry and Smithy were applied by the weight of product produced and based on the operation performed. Once established, standard rates simplified the processes of working up an engine cost, valuing transfers and the calculation of profit. An inconsistency appears in as much as there seems to have been no attempt to calculate cost variances or even to compare actual cost with the pre-determined rates, yet the Fitting Book recorded actual times and actual expenses. It could well be that such analysis simply remains to be discovered or that it was not considered to be necessary.

Cost accumulation was an important activity, and was a basis for further activity. Costs were used as a basis for prices and as a check on profitability. Prior costs were referred to when preparing quotations for the supply of engines, and they were referred to when working out prices for non standard engines or parts. The accumulated facts of the past then became a basis for the actions of the future.

References

MANUSCRIPTS:

MBP; Matthew Boulton Papers, Birmingham Central Library, Birmingham, England.

B&W; Boulton and Watt Collection, Birmingham Central Library, Birmingham, England.

Dickenson, H., *James Watt*, University Press, Cambridge, 1935.

Dickenson, H., *Matthew Boulton*, University Press, Cambridge, 1936.

Gale, W., "Soho Foundry, Some Facts and Fallacies", *Transactions of the Newcomen Society*, Vol. 34, 1961-2.

Hamilton, R., *An Introduction to Merchandise*, 2nd ed., C. Elliot, 1788.

Law, R., *The Steam Engine*, HMSO, London, 1990.

Mepham, M., *Accounting in Eighteenth Century Scotland*, Garland Publishing, 1988.

Roll, E., *An Early Experiment in Industrial Organisation : Being a History of the Firm of Boulton and Watt, 1775-1805*, Longmans Green and Co., 1930

Rolt, L., *James Watt*, BT Batchford Ltd, 1962.

Shapiro, S., *Capital and the Cotton Industry*, Cornell University Press, 1967.

Tann, J., ed., *The Selected Papers of Boulton & Watt, Volume 1*, Diploma Press, London, 1981.

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