PAPERS

Workers' Last Performance: Why Some Factories Show their Best Results during Countdown

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In this article we highlight rationalizations within industry that were initiated and conducted locally during overt or latent threat of plant close-down. A common feature in our four investigated cases of 'declining organizations' is that the surprising increases in productivity cannot be thought of as the result of 'management by fear' or other active measures taken by management. On the contrary, our findings suggest that the 'close-down effect' is brought about through workers' active and creative involvement in production matters when managers' interest in maintaining the established order at the workplace is fading away.

Unexpected Productivity Increases

In several cases we have observed that managers in close-down factories have been surprised by the fact that production results are better during the countdown period. After the close-down, managers evaluate the performance during the advance notice period until the termination of operations as 'a surprisingly good production result'; 'we have never experienced better performance'.

This article explores possible explanations for the 'close-down effect', which we here choose to treat as an unexpected social phenomenon. A well-known case of unexpected increases in productivity originates from the laboratory experiments performed at the Hawthorne plant of Western Electric Company, situated on the outskirts of Chicago. The results from these experiments are well known, so let us only point out that one important finding was

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that social norms, emerging informally in work groups, have an impact on their output. But beside the discovery of a social human being, as opposed to the implicit assumption of a purely economic human being in Taylor's world of ideas, the Hawthorne experiments also revealed that group norms could be influenced by friendly management attention and/or skilful manipulation. The effect of being a 'guinea pig' – selected to participate in a scientific experiment – gave the girls at Hawthorne the impression that management paid special attention to them. This, rather than the planned variations in working conditions, set by the researchers, is said to explain the girls' increasing work efforts during the Hawthorne experiments. This is usually referred to as the 'Hawthorne effect' (Schmidt, 1974; Thompson and McHugh, 1991).

A common feature in declining organizations seems to be that management's control over the daily operations is diminishing. This is of course a consequence of the plans and/or decisions to close down. In close-downs we have a situation that is rather the opposite to the Hawthorne case, with its attentive management and scientists. In some declining organizations we find that when top management's attention decreases, productivity increases. Our case studies and findings in the literature indicate that unexpected productivity increases during countdown may have a variety of context-specific causes. Some of them can be of a rather trivial kind. For example, operations can be speeded up through intensified work if conditions are made favourable to workers through raised piece-rates; production management may decide that there is no further need to save equipment from excessive wear, and so on.

But our primary interest concerns cases of raised performance that have more interesting causes. Those cases show us that 'innovative skills' (see Fricke, 1985) acquired through individual and collective experiences at work can find operative space in an organization where there is scope for worker autonomy. In some cases of close-down this seems to be the case. The reason for this, we argue, is that managers' and supervisors' interest in maintaining the established order at the workplace fades away in a dying organization. Future plans for the operations, including major investments, are no longer at the top of the management agenda. In some of our case studies this is clearly shown, but the interviews we carried out at the same plants show a multitude of motives among employees governing their innovative actions.

Obviously declining operations are not the only situation where one can expect industrial bureaucracy to be rather inoperative. In fact the Klondyke setting – where new production is set up with scarce resources – seems to evoke a situation where unexpected increases in productivity are achieved through self-organized work on the shopfloor. Friedmann (1992) describes some interesting natural experiments that occurred in armament production during the Second World War. In some American factories, originally investigated by P.F. Drucker, the organizational practices of scientific management were upset without any visible agent of change. Drucker had the chance to compare two tank-manufacturing plants, controlled by the same company. One of them was built up in a rather improvised manner, and the task of organizing and executing daily work was left to the workers. Together with their supervisors they 'had spontaneously introduced work rotation and job enlargement'; and the engineers worried over the sloppy organization. But the total end result was at a higher level in this hastily set up factory than in the other, carefully engineered, one. This 'surprising experiment', as Friedmann puts it, was later to become standard for both factories (Friedmann, 1992: 40–2).

In summing up these scattered examples of unexpected increases in productivity during extreme conditions, there seems to be one common denominator, namely, that workers' self-rationalizations took place in a situation where management's attention was absent.

Declining Operations but Increasing Productivity – The Horndal and the Close-Down Effects

Rationalizations in industry are normally initiated and conducted by management. But here we address rationalizations invented and carried out locally, including the shopfloor level, during extreme conditions. We recognize two 'ideal types' of local self-rationalizations which have in common that increases in productivity are achieved without investments. The first type is what in Sweden is referred to as the 'Horndal effect' and the second is called the 'close-down effect'. The Horndal effect refers to the surprising increase in productivity displayed in a Swedish steelworks during a period of 15 years where there was no budget for investments. A threat of close-down was prevalent during all those

years. Our second 'ideal type', the close-down effect, is rather similar to the Horndal effect, but with one significant difference: productivity increases during the period of final countdown, namely the advance notice period before termination of company operations.

Before describing these effects more thoroughly we wish to pinpoint some of their similarities and main differences. The Horndal and the close-down effects are both outcomes of a common context, namely extreme conditions. A common feature is that the latent threat or decision to shut down operations makes it difficult, or even impossible, to argue in favour of investments. Usually no major investments are made, only minor alterations. In the classic case of Horndal, production was in economic crisis, with an almost permanent threat to close down operations. In contrast, the close-down effect appears after the decision to shut down is publicly announced by management. This is a situation where further investments are cancelled, including those aiming at preventive maintenance.

The Horndal Effect

A closer look at the steelworks at Horndal reveals that during a period of 15 years, no investments were made. Top management later used Horndal as a 'reference plant', to compare other plants with. The assumption was that productivity increase would be zero, because no investments were made. Surprisingly for top management, productivity figures showed a steady increase by approximately 2 percent annually during 1935–50. In comparable plants, where investments were made, productivity increased by 4 percent annually.

One important condition for the unexpected increase in productivity at Horndal is that the plant was in permanent survival crises. The owner, the Fagersta Group, concentrated its production because of the crisis in the steel industry during the 1920s. The Group also considered the possibility of closing down the plant at Horndal. One reason for this was that the profit margin on steel products produced in Horndal was very small. An additional disadvantage for the Horndal plant was the outdated production equipment owing to the lack of investments.

What should be kept in mind, however, is that the kind of actions taken by plant management and workers on the shopfloor were

rather different. The production management put their efforts in planning production better and utilized all possibilities to improve production techniques as far as this was possible without a budget. Workers, on the other hand, had seen their fellows at the other plants increasing their salaries during the past years. When management at Horndal launched incentive schemes, workers responded by 'voluntarily' trading off slack against more work and better pay. Genberg (1992) orders the factors, in order of relative weight, contributing to the Horndal effect as follows:

1. Minor alterations in the capital equipment including changes in rolling practice.
2. Organizational changes such as central planning and organization of the work between plants of the Group that meant improved utilization of capital equipment.
3. Workers increasing their work efforts.

The plant's management had a reputation for its thrift policy. 'No unnecessary expenditure is too cheap to be avoided if possible' as the local management in Horndal put it. Salaries and piece-rates were held down and even pressed down. In an evaluation of Horndal 1933/4 made by the Group management, they assigned the plant at Horndal a value equivalent to scrap iron. Local management was, however, able to carry out some rationalizations by improving the production equipment at a low cost (Kronlund and Wigblad, 1979). To sum up: the Horndal effect was the outcome of local management's rationalization efforts and workers accepting an intensification of work pace during a period of latent threat of close-down.

The Close-Down Effect

In two case studies by Wigblad (1995) concerning restructuring in 'company towns', namely communities where one company dominates the local labour market, the main issue was to explore the possibilities for rebuilding the local business district. While carrying out fieldwork Wigblad also noticed an increase in productivity in one of the companies, Marmaverken. This occurred during an advance notice period that lasted four years prior to shut-down. A thorough analysis of output records revealed that during this

period the increase in productivity was substantial. In the year prior to the termination of operations in the plant, the average daily output was 6 percent higher than the previous all time high level.

Increases in productivity during periods of close-down have also been studied by Sutton (1987). He studied eight cases with comparably short advance notice periods, between two weeks and a year. In those cases, performance after the decision to close down was found constant or improved. One of the explanations he offers for this is that employees voluntarily increased their work efforts because they found it interesting and challenging to perform new tasks in the now understaffed organization. Other explanations given are that employees want to work their way into a new job and need a good recommendation from their employer. Greenhalgh and Sutton (1991) also launch a psychological explanation: when uncertainty about the future becomes cruel certainty, namely lay-off, psychological tension is released and hard work becomes de-stressing.

Analysing the causes of close-down effects solely on the employees' mental states is not satisfying. Collective actions in declining organizations obviously have social aspects related to the context in which they take place which must be considered in any serious explanation. But this is not the only problem to confront. We have also found that the borderline between the ideal types, the Horndal effect and close-down effect, can be rather blurred in real-life cases. However, we maintain this distinction for analytical reasons. The point of doing so becomes clearer when we look at another case – the Hammar Glass Works.

The Hammar Glass Works Case: Both Horndal and Close-Down Effects

The Hammar Glass Works was a bottle production plant in the PLM Group until its close-down. Close-down was at the top of the management agenda for several years. During this time local management improved production without major costs. When the timetable for close-down was finally drawn up, the advance notice period negotiated was two years before production ended in summer 1992. During these two years output increased by 4 percent, which equals 2 percent annually. This increase was compared to the budget level for 1990. This implies that no further management

demands to increase productivity, above the 1990 level, were at hand in Hammar during these two years. The increasing output by 2 percent per year in Hammar almost equals the figures in domestic glass production over previous years, the latter reaching an average level of 2–2.5 percent per annum. The figures from Hammar during the advance notice period indicate that something had happened behind the factory gates. The question is of course what, and why?

A Look Inside

The decision to close down operations created entirely new conditions for performance. Trade unions were in a strong position when it came to formal or informal negotiations about production matters. As stated above, the unions had succeeded in their attempts to prolong the advance notice period for two years, to gain time for investigating new job opportunities. The negotiation situation referred to is compulsory according to the Swedish Act of Co-determination that obliges top management to provide the trade unions with the information they request and also to negotiate possible structural alternatives to closure. The power to decide is, however, in the hands of top management, which in Sweden usually results in close-down periods of approximately four to six months.

At an early stage of the negotiations it became obvious that a prolongation of the factory's life was economically viable. Discussions later dealt with the question of how long it was economically possible to prolong the life of the factory. The local trade unions engaged a wage-earners' consultant to investigate possibilities. In Sweden, a wage-earners' consultant is made accessible to employees at the company's expense when critical issues are raised around the company's economy or employment contracts. When decisions about close-downs are at the top of the agenda, a wage-earners' consultant acts on behalf of the local trade unions.

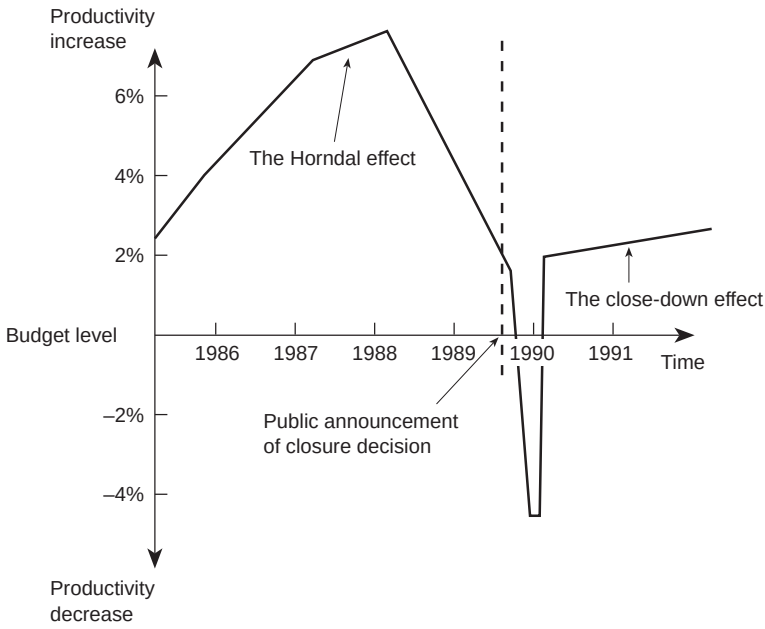
Although cost-evaluations in the Hammar case indicated the possibility for a three- to four-year prolongation, this alternative turned out to be unrealistic. This was later confirmed by an evaluation made one year after the negotiations. The evaluation report actually showed a more rapid decline in the market than expected. After intense discussions about facts, the negotiating parties agreed to prolong the life of the factory for two years. The countdown period would be used to find innovative alternatives. An adjustment

in plans was made and the life of the factory was prolonged two years. In addition, top management provided an extensive human resource programme involving out-placement aid, retraining and severance pay. When the negotiations started, the investment plans were already in an advanced planning stage. However, the outcome was not impressive from a union point of view. This was mainly due to a general decline in the business cycle in Sweden during 1990/2. When production was terminated in 1992, some new employment opportunities (55) had been created. Today, however, efforts to rebuild local industry in Hammar are continuing through work in a new real estate company temporarily sponsored by the Group.

The plant management acted forcefully in the production planning process. They proposed and argued in favour of a production assortment during the run-down process, which was familiar from previous production periods in the plant. This plan was adopted, which, of course, made it easier to maintain high productivity. For example, there was no introduction of new and unknown glass bottles in the plant during the advance notice period. These favourable conditions meant fewer adjustments, which in turn meant a smoother production flow. Employees were later asked to explain the good performance during the advance notice period. The answers from five supervisors and ten workers, summarized in order of frequency, were the following:

1. The easy way out for all employees is to work as usual. Production runs more smoothly and no conflicts emerge among workers. However, motivation to put in extra effort is lacking.
2. Workers feel better if they do their work as usual. Self-esteem improves if one performs well at work.
3. Some workers maintain a preservation strategy. They hope that if they do a good job, production will be prolonged.
4. The lack of pressure towards increased productivity creates a more relaxed atmosphere than before.
5. The bonus system contributes to good performance during the last months of operation.
6. A few workers want to take revenge on another plant in the Group.
7. There is an old pride of craftsworkership in the plant.
8. In a 'company town' (one factory dominating the village) there is a good spirit and unity creating a collaborative attitude.

FIGURE 1
Output in the Hammar Glass Works



Our interpretation of these findings is that the improved productivity was not a result of deliberate worker efforts. They were merely keeping up with their ordinary jobs. Local management activities, however, were an important factor influencing the result.

Let us compare the close-down and the Horndal effect in the Hammar case. They are both illustrated in Figure 1.

The Horndal effect appears during the period 1986–9. The close-down effect appears during the advance notice period, 1990–2. There was a distinct drop in output during the negotiation period in 1990. 'Normal increase' in output is the locally used measure which is based on historical experience. It usually meant an increase of some 2–2.5 percent per annum, including the impact of investment programmes. Although the budget level increased every year until 1990, it was fixed during 1991 and 1992, due to close-down negotiations. Considering that the Horndal and the close-down effects are both brought about without investment, they appear to be suprisingly strong.

The Horndal effect in Hammar corresponded to a similar effect in the sister plant, Limmared, during the same period. More investment was made in Limmared, but employees in Limmared stated that they could still be hit by a close-down decision. Evidently the major investment decision was also planned together with the close-down decision. Experiences from the Hammar and other cases show that there might be some similarities between the Horndal and the close-down effects. Both can be seen as measures towards rationalizations originating from different levels of the organization at the local plant.

But is the increased productivity in Hammer of the same kind as that reported from Horndal? One important and obvious difference is that in Hammar there was not only a latent threat, later on management in fact decided to close down operations. In the Hammar case the organization became a temporary one, officially walking its way to the grave. In Horndal this was not the case; although not prospering and under threat of closure, it definitely was a permanent organization.

Two years before the close-down decision in Hammar, management had already lost interest in the operations. After a period of uncertainty about the future, before the schedule for countdown was announced, there were no demands or incentives given for extra effort to be made in the closing-down factory. The management offer was of the 'if you stick to the previous year's budget level, we are prepared to pay you a bonus' kind. Incentives for workers to increase productivity beyond this 'normal' bonus level were nil, but productivity increased anyway.

In the case of Hammar, the close-down effect was not as dramatic as the Horndal effect prior to the close-down decision. Let us study a close-down case with really high performance, comparable with the Horndal effect that appeared in Hammar. Is it possible to find similarities between the Horndal and the close-down effects in a case with a very long advance notice period?

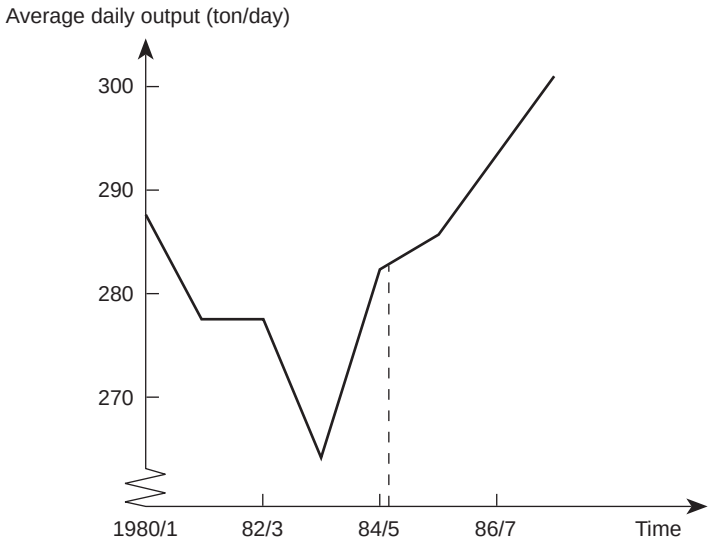
The Case of Marmaverken

In 1985, the Swedish business group Korsnäs Inc. decided to close down its Marmaverken pulp mill plant with 250 employees. The village of Marmaverken had 800 inhabitants and its economy was highly dependent on the pulp mill. A disaster seemed imminent.

Yet, when the mill was finally closed in 1989, only 15 employees were laid off and the local economy remained healthy because of the arrival of new employers. This was due to corporate sponsored project work with innovative alternatives and human resource programmes during the countdown and the advance notice periods. A successful restructuring had occurred because of close cooperation between three important parties – top management, the trade unions and the local government (Wigblad, 1995).

The countdown period in Marmaverken was an extremely long one that lasted four years. As expected, the organization was put under pressure when employees abandoned it. Despite this problematic situation, the increase in productivity was substantial. The year prior to the termination of operations in the plant, the average daily output was 6 percent higher than the previous all-time high level. Considering that the organization was tightly slimmed down, this was an extraordinary performance (Wigblad, 1992). Compared to the Hammar case the productivity increase during countdown is most impressive (see Figure 2). Due to the minimal changes in technology and market demand between 1980/1 and

FIGURE 2
The Close-Down Effect Measured as Aggregated Output in the Marmaverken Case, between 1985 and 1989. (The dotted line indicates the date for the announcement of the close-down decision.)



1987/8, it is possible to make a fair comparison between productivity figures for the two periods.

The Marmaverken plant was shut down in 1989. However, this example shows that it was possible to maintain and even increase production during four years. During this countdown period it was possible to transfer three or four of the regular staff into other jobs. These findings suggest that there are good prospects for a creative work culture to emerge during a long advance notice period. And the Marmaverken showed a result far beyond 'ordinary performance'.

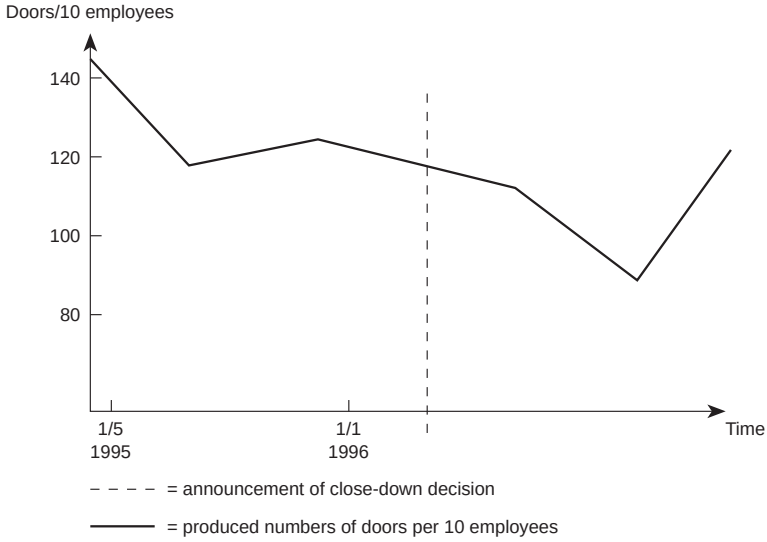
The Cabinet Factory Case

Results from these cases must be put into perspective. They derive from contexts where management showed an interest in reaching an agreement with the local parties that was acceptable to both sides, given the circumstances. Such management strategies contain a socially responsible orientation towards win-win solutions, described by Wigblad (1995). Since those cases are rare, we now turn to a close-down case of a more common kind. This case is a cabinet factory where one would not expect a close-down effect. The information given in advance from the local management stated that productivity was declining. It was also stated by local management that the factory had experienced extremely bad performance during the advance notice period and that relations between management and employees were highly antagonistic.

The cabinet factory produced doors and had 120 employees prior to close-down. Door production is labour intensive compared to the previous cases described. The factory had adopted several of today's popular production concepts: semi-autonomous group work was put into practice, the company was certified according to the ISO 9001 norms and the factory had the best profitability in the division as part of the company group.

Management's decision to close down disregarded whatever arguments were put forward by the local parties, trade unions and the local management. Surprisingly to all local parties, the previous output records showed a recovery in performance during the end of the run-down period. The rate of change is as dramatic as the decline in performance after the announcement of close-down

FIGURE 3
Aggregated Statistics Concerning the Close-Down Effect in the Cabinet Factory. (The dotted line indicates the date for announcement of the close-down decision.)



(see Figure 3). Changes in order input have been considered and the productivity curve has been adjusted accordingly. Adjustments have also been made according to the production time associated with specific doors in the assortment. These adjustments of the productivity curve have also been approved by the local management.

The negotiations between unions and management lasted until the last performance recovery period in the end of the final countdown. Workers and local trade union representatives stated that management did not take their arguments into account at all. Management justified their decision to close down operations with the argument that this was the consequence of a restructuring plan for the whole business unit. The cabinet factory was hit only because it was the smallest plant, a decision that fitted best into the Group's restructuring plan.

The first drop in productivity occurred when it became clear to the local trade union that management did not listen to the substantial arguments put forward by them. Management was initially opposed

to applying any kind of bonus incentive system or severance pay. When top management finally agreed to a bonus system, it was on such a low level that it was not accepted on the shopfloor. Local management then doubled the bonus without consent from top management, and productivity finally recovered a little. When top management announced that they wanted to fire the local manager, a spontaneous sit-in action altered this situation, and his employment was continued. There was also disagreement concerning an education programme for the employees, aiming at upgrading their computer skills.

Results from interviews with 24 employees out of the former 120 revealed:

- Employees at the cabinet factory stated that they felt free to counteract management proposals individually as well as collectively. One reason for this was the awareness that previous performance was very good.
- Prior to the interviews, employees were not aware of the performance recovery during the end period shown in Figure 3. The increase in productivity can partly be explained by a shrinking number of employees.
- The easy way out for all employees was to work in slow motion. Motivation for average effort was lacking.
- Workers had a long tradition of taking pride in their craftsworkership as well as acting collectively.

There was a long period of uncertainty for the employees and several times they responded with drops in productivity to what they perceived as management hostility. But when the negotiation was concluded, with poor results from the viewpoint of employees and local trade unions, productivity actually recovered for a short period before final close-down.

This case shows how coercive management measures provoked workers to strike back. Moreover, productivity in the cabinet factory did not recover to the previous level. This was partly due to the short countdown period and a management who did not think they needed an agreement with the workers.

The Continuous Casting Plant at SSAB-Luleå – Horndal and Close-Down Effects in One Case?

Finally we explore a case of self-rationalizations within the steel industry (Bergman, 1997). Here it becomes clear that the borderline between the Horndal and the close-down effect in fact can be rather blurred. The continuous casting plant studied was at the top of management's agenda for closing down operations from 1976 until the early 1980s. However, the interesting point with the case is that productive measures were taken by the steelworkers and supervisors themselves during a period of three years. This case strengthens the argument that management's interest in keeping traditional patterns of control intact is small in an organization which they conceive as temporary. In this case, the work teams used the scope for self-governed actions aiming at technological and organizational rationalizations. We present a brief overview of what actually took place during the late 1970s at this continuous casting plant in northern Sweden and try to explain what triggered this outburst of creativity on the shopfloor.

The Context

The context is rather similar to that in Horndal, but it also resembles the clean-cut case of close-down in Marmaverken. First, there were no (planned) investments made and second, the increases in productivity occurred during a period of latent threat of closing down the continuous casting plant. Close-down was a prevailing threat from the mid-1970s and was carried out a decade later. But the way to final close-down was paved with death-signs: periods of shutdown; reduction in staffing levels; organizational merging with the sister department and (almost) from the outset of its productive life, no planned investment. On the other hand, unemployment was not a serious threat to the workers; they felt sure that the formerly completely state-owned company would stick to the same favourable personnel policy as before the restructuring in 1978 when the company was introduced on the stock exchange market.

The market situation that faced this plant with its 70 or so workers was problematic from the very beginning. In 1976, when the plant was delivered and tested, it was put to rest because the market for its products (slabs) was shrinking and competition with low-wage

countries like Portugal was fierce. At the end of 1978 market prospects looked better and management decided to put caster No. 3 into operation. In 1979 the plant was being run with full crew – five shift-teams, with 14 workers each. But the market declined once more and one of the shift teams was sent to other jobs in the steelworks. It was, in fact, only from 1978/9 until 1982 that the plant lived 'a life of its own with regular operations'. During those years the plant became the scene for highly unexpected forms of self-managed rationalizations.

Shopfloor Activities

An article written in 1982, in the union magazine, commented on the actions taken by workers at slab caster No. 3 in Luleå during the steel crises years of 1979–82:

> . . . the workers improve the plant without taking the long bureaucratic road. . . . Instead they fix the material they need themselves and build what is needed: a storeroom, a repair shop, a platform for cleaning the overhead crane and, especially, what saves millions of crowns for the company: they have improved the construction of a device, known as breaking pins, that hold the cast slab. They know their job and the bosses are becoming superfluous. By taking care of the molten steel better the workers save a further 2–3 million crowns annually. (*Metallarbetaren*, 1982)

This general picture was no overestimation of what took place: in an interview the vice-chair of the local trade union, also one of the active workers from caster No. 3, explained that this was a period of intensive experimentation on the shifts (Bergman, 1985). Having no money to realize their improvements, workers took what was needed from the scrap yard and made the constructions themselves. Some of them, the union chair explained, started reading British and American steel magazines. Researchers and some of the higher echelons in the company became interested; some of them also gave their silent or overt support. What made all this possible, he said, was the low level of plant utilization and the support from above.

In a series of interviews conducted in 1996 and 1997 the productivity improvements were confirmed (Bergman, 1997). One of the interviewees could actually show production reports for some of the years in question showing that the utilization of raw iron was

approximately 3 percent higher at this plant than on the sister machine. In sum this meant some 6 million kronor better annually. Although these favourable figures cannot be attributed to workers' efforts alone – the sister machine was older and also had some structural problems remaining – they obviously show that the workers' initiatives had productive effects.

A Creative Culture at Work

Some of the measures taken by workers towards more effective production have been mentioned. But there was more to it, as the interviews carried out two decades later showed. There was not only the nightly 'borrowing' of material and spare parts. There was also an emerging culture at work which one of the interviewees summed up in the phrase: 'Do it first and ask later. It was us that tested and checked it out. We did it on the sly, from underneath.' And there were not only technical innovations that were carried out – although these were often mentioned with special warmth – there were also organizational improvements. The latter had some features in common. First, a lot of tasks normally performed by technicians and engineers were informally taken over and integrated in the daily work. Second, most shift teams broke up the specialized work roles, for example it became common practice to rotate between different jobs.

The different jobs were at the outset distributed to small work groups along the flow of steel. Within the groups there was usually some rotation between different jobs, but seldom between the different work stations. In practice this meant that the team downstream in the production flow could not get free to join their mates for a break at the same time. The jobs downstream were also those with least autonomy at work. The workers there could not leave their post as easily as their workmates upstream. Most women at the plant worked downstream, with jobs (automation control) that were held to be more suitable for women as they were not physically strenuous.

The workers at caster No. 3 rearranged the existing jobs with the intention of breaking the borders between the teams upstream and downstream. This was in no way dramatic, it just meant that some of the casters changed job with workers downstream or helped them at the end of a casting. But it was also a shift towards a

levelling of the burdens of work, a break with a gender division of labour and probably also a symbol for comradeship. These and other breaks with a rather stiff division of work were, however, not the most significant actions taken from below. The actions mentioned above only meant that the horizontal division of labour was to some extent broken up. Actually these kinds of rearrangements were not limited to just caster No. 3, they were also made by workers at the other casters. More unique were the actions taken in order to improve casting technology; a huge number of technical innovations were initiated and carried out by the workers. In essence this meant taking over functions normally carried out by technicians and production engineers. As mentioned earlier, some workers started reading American and British steel magazines in order to find new ideas for improving the plant.

Many of the technical innovations were unofficially sanctioned by progressive parts of production management. But there were no official sanctions: workers looking for usable parts of equipment on the day shift (at the scrap yard for instance) and 'stealing' it at the night shift was not normal company practice. But the innovations carried out by workers at caster No. 3 were not only of a subversive kind. Among the officially approved, and also financially rewarded innovations was a solution to a technical problem that saved about 4 million kronor per annum. However, this proposal, signed by some four or five workers and the day boss at the caster, resulted in a fierce discussion about how much money the company would in fact save due to the innovation. This is of course not unusual, workers' and management's estimations of productivity gains due to workers' innovations are likely to be rather different. But in this case workers' calculations were supported by estimations made by a production engineer who made the calculations for the company. There was a long period of negotiation and argument, but the point to be made here is that this resulted in the fact that the creative efforts made by workers at caster No. 3 never became officially sanctioned. They were later regarded as a specific kind of (bad) habits, 'caster number three habits'. But this did not mean that workers' efforts ended in 1979, they actually continued as a prevailing work habit until 1983.

There were also other events that marked an uprooting of established ways of doing the job. Anyone familiar with steelworks knows that tidying up is not precisely at the top of a steelworker's agenda. But at caster No. 3 the workers started cleaning and painting their

machinery as well as keeping their own lunchroom neat. Although this obviously was an opportunity provided by the low level of plant utilization, the symbolic value of this new 'workers' regime' should not be underestimated. It was also a signal to those around, as if to point out who was actually in charge at caster No. 3.

Shopfloor Culture

Explaining this phenomenon is of course tricky, especially if one aims at reconstructing the causal links leading to the sudden rise in productivity. Instead, we put forward an explanation that takes three factors into account. First, the actual situation. Second, the work setting with its socializing effects and inherent possibilities for joint actions. Third, the biographical make-up of the subjects, that is the workers' life experiences.

There was a latent threat of close-down during the years when these events took place at caster No. 3. But as many of the workers explained later, the risk of losing the job was not so great. What was a perceived threat, however, was the risk of losing one's job at this particular plant. The work culture that emerged was a result of different actions taken towards getting 'more control over one's conditions at work', as an interviewee explained it. Also many workers mentioned that their immediate aim was to ease the burden of work and have more fun at work.

The daily work at a continuous casting plant at this steelworks had some important characteristics. First, it was team work, meaning that most work tasks could not be mastered without cooperation between workers, both at the different work stations and between them. But dependencies of a technical and functional nature were not the only source of cooperation; there were also strong collective norms about what a good workmate should do in terms of a helping hand or head. In short, the local work culture was the outcome of both production demands and workers' collective norms. The scope for individual and collective improvization in daily work was a functional necessity: the many unforeseen events that emerged during daily operations rendered rigid patterns of control dysfunctional. This actually holds true for most of the work at casting machines in the steelworks during the late 1970s. The point is, with respect to the events at this particular caster, that workers' discretion at work meant that improvization and problem-solving

were parts of an established work culture. The 'factory regime' had much in common with the one that Friedman (1977) has called responsible autonomy: a silent contract between management and workers where responsibility is traded against work autonomy. But this was a situation emerging out of management's lack of technical control over the production process, not a concession to militant workers or their union. Overall the daily work culture was of an 'action-oriented' kind that also showed the imprints of cooperation in daily work.

So far this was nothing unique for caster No. 3. But there was a peculiar combination of lack of workers and plenty of time at this caster. There was a shortage of men (and women) at the different work stations during casting operations on the one hand, but on the other hand hours could elapse between casting sequences. This was a source of problems and one of the reasons for breaking up the fixed work roles, but it was also a resource – time for intellectual work on the shopfloor. To sum up, the latent threat of closing down, favourable conditions for developing a creative work culture and an interest from workers to preserve their workplaces, were the 'objective resources' that accumulated during the late 1970s at caster No. 3.

Subjective Resources

But the workforce was also of a specific blend. The workers recruited to the casters at Luleå were comparatively young, most of them about 25. Many of them also had some kind of training for skilled work. Also many of them shared the experience of being brought up in rural parts of northern Sweden where small farming, forestry, fishing and hunting were a common occupation. This was in essence a way of life typical of self-employed small farmers (without a conservative political bias; the northern parts of Sweden have for a long time been a stronghold for left-wing voters) accustomed to doing work their own way. Many of the workers interviewed at caster No. 3 used the expression 'we did the job the way farmers do', to describe the emerging work habits. In practice this meant a habit of solving problems at work much in the same way as they did at home: welding a broken railing at the job or mending the snow scooter at home was done in the same matter-of-course fashion.

The creative work culture that emerged at caster No. 3 can be understood as a combination of a locally moulded working-class culture and the culture of the self-employed small farmer, both marked by a huge amount of self-will. There are, however, important differences regarding the basis for these work habits: with the self-employed farmer it is private ownership that is the source of individual work control; with the worker the actual use of one's own discretion at work relies heavily on hidden or overt collective norms.

Horndal Effect, Close-Down Effect, or Just Another Case of 'Making Out'?

The creative work culture flourishing at caster No. 3 emerged in a situation of latent threat of closure. This situation was not only perceivable as a threat, it also offered time for workers and their supervisors to develop solutions to technical problems and organizational obstacles. Time was an important prerequisite; in fact most of the self-rationalizations faded away when the workforce at caster No. 3 was slimmed and reorganized. The duration (almost four years) of the creative work culture relied on the overwhelming and active support it gained from below, but also on the silent support from strategic parts of production management. The unexpected increase in productivity at caster No. 3 at SSAB-Luleå resembles the Horndal effect in that it was brought about without investments. But there are also differences. The events that took place in Luleå were to a large extent the outcome of workers' deliberate activities. They were acting as active subjects (or 'as-if-owners') carrying out rationalizations that had no influence on their wages. Monthly, fixed pay was introduced in this formerly state-owned steel works in 1971. In Horndal, workers had a share in the productivity gains according to a piece-rate system which offered workers the opportunity to trade off slack for better pay (Genberg, 1992).

Understanding the events at caster No. 3 as a case of 'making out' where consent is also 'manufactured' (Burawoy, 1979) does not make much sense here. On the other hand, it is likewise hard to describe the events resulting in increasing productivity as purposive measures taken towards convincing management to postpone close-down of the plant. A more fruitful way to analyse this case is to

comprehend it as the emergence of a specific work culture: a culture that was the outcome of a latent threat of closing down coinciding in time and space with the actors' past and present experiences; the former consisting of experiences acquired from small farming and at work; the latter marked by team-working and the self-confident handling of liquid steel and other hazards.

Conclusions

Sutton's (1987) study showed that productivity could increase rather unexpectedly in declining organizations. His study was, however, based on a sample of close-down cases marked by the absence of severe conflicts over resources and obligations; researchers were in fact denied access to such organizations. Sutton's (1987) study is also based on managers' opinions: his informants were employees with formal authority to close down organizations or to orchestrate the implementation of closings. In contrast, our cases of closure suggest that conflict over resources as well as workers' collective actions are important factors to take into account. The actual context of work is, however, also important: the kind of labour process and the type of jobs performed seem to provide different conditions for unexpected creativity on the shopfloor. And it is this creativity that we have found to be a major reason for unexpected increases in productivity.

Our cases in process industry, marked by increasing productivity during comparatively long countdowns, have in common that jobs on the shopfloor were semi-skilled or skilled and often marked by team work. Also, the production at the plants was sensitive to the quality of work efforts: successful operation called for workers' active involvement in production matters. Some of our cases were also marked by the functional necessity for cooperation between workers; this being an effect of a complex production system that called for attention not only to individual work but also to work tasks performed by fellow workers. Workers in this kind of job often acquire skills – through individual experience and shared knowledge – that exceed those demanded in daily work. Fricke (1985) has labelled this kind of knowledge 'innovative skills' just because they imply the competence of rearranging and innovating the workplace when conditions are favourable. Fricke (1985) also found that these creative skills seem to emerge at workplaces

marked by team work and/or possibilities for social interaction; these conditions were also found in the cases mentioned here.

A common feature in the 'declining organizations' studied was that productivity increased in a situation where management control over daily operations was diminishing. Management's interest in keeping traditional patterns of control intact was rather absent in the organizations that they conceived as temporary. Actually, in our cases, staffs were expected only to secure the 'minimum' acceptable level of production. Our cases indicate that this was a situation where workers' innovative skills, acquired through experiences (often common) at work, could find operative space.

We are the first to admit that we have not found a final explanation for the puzzling phenomenon that we have called the close-down effect. Our cases are not symmetrical regarding the data concerning worker behaviour or productivity increases over time. Nevertheless we argue that the close-down effect is a genuine phenomenon that crops up in a number of cases. On the other hand, cases showing that management by fear can successfully enforce productivity increases through intensified work efforts and so on are well documented, an illustrative example is given by Schumann et al. (1982). Paradoxically, increases in productivity also appear in our close-down cases although they are examples of the opposite, namely 'management by absence'. This calls for further research.

Investigating the close-down effect is, however, not an unproblematic task. Although productivity increases can be presented in convincing graphs or in estimations, it is not unproblematic to use productivity measures like volume/working hours and so on. In some cases it is obvious that the production mix is changed after the announcement of close-down and this renders a comparison with previous measures of productivity impossible. Also a measure like value-added is a problematic basis for comparisons, because it introduces an uncontrolled independent variable into the calculus of worker productivity, namely market pricing of products. This productivity measure then has the obvious drawback of being less correlated to workers' productive efforts. For these and other reasons we have used locally accepted productivity measures for comparisons. For some of the cases this has meant that we have had to reconstruct production data from the countdown period, because local management had discontinued their previous accurate productivity measurement.

We strongly believe that any explanation of close-down effects needs an elaborated sociological view of work that also takes the origins and species of local work culture as well as the objective scope for action into account. Interestingly enough, this means bringing worker subjectivity back to the research agenda (see, for example, Knights, 1990; Willmott, 1990; Bergman, 1995), a question which lay dormant for almost two decades in critical work life research. Bringing in subjectivity does not imply asking about workers' attitudes or understanding them as expressions of a general class culture. Instead, we argue that subjectivity should be understood as the outcome of a local work culture that is dependent upon both the experience gained in daily work and the specific social setting of the workplace, as well as workers' biographically acquired experiences.

Last but not least: long periods of advance notice are often regarded as costly for a company. The process of closing down is often thought of as something that should be executed as fast as possible. Managers' arguments in favour of this are often based on the assumption that productivity will decrease. Our findings suggest that productivity can remain high, or even increase, during a long countdown period and that such a period can provide trade unions and local officials with time for planning constructive measures.

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References

Bergman, P. (1985) *Teknik och lagarbete – teknik, arbetsorganisation och arbetsvillkor vid stränggjutning*, TRITA-AML-0145. Stockholm: Arbetsmiljölaboratoriet, Tekniska Högskolan i Stockholm.

Bergman, P. (1995) *Moderna lagarbeten. Studier av arbete, teknik och organisation i högteknologisk processindustri*. Lund: Arkiv förlag.

Bergman, P. (1997) '"Blev som en jävla anda där". Om oväntade arbetsformer under nedläggningshot', *Arkiv* 71: 63–78.

Burawoy, M. (1979) *Manufacturing Consent. Changes in the Labour Process under Monopoly Capitalism*. Chicago, IL: The University of Chicago Press.

Fricke, W. (1985) 'Soziologische Aspekte industrieller Arbeit', pp. 142–79 in W. George et al. (eds) *Arbeit und Wissenschaft: Arbeitswissenschaft?* Bonn: Verlag Neue Gesellschaft GmbH.

Friedman, A. (1977) 'Responsible Autonomy versus Direct Control over the Labour Process', *Capital and Class* 1.

Friedmann, G. (1992) *The Anatomy of Work. Labor, Leisure and the Implications of Automation*. New Brunswick, NJ and London: Transaction Publishers. (Originally published 1956.)

Genberg, M. (1992) 'The Horndal Effect: Productivity Growth without Capital Investments at Horndalverken during 1927 and 1952', Department of Economic History, University of Uppsala.

Greenhalgh, L. and R.I. Sutton (1991) 'Organizational Effectiveness and Job Insecurity', pp. 151–71 in J. Hartley et al. (eds) *Job Insecurity: Coping with Jobs at Risk*. London: Sage.

Knights, D. (1990) 'Subjectivity, Power and the Labour Process', pp. 297–335 in D. Knights and H. Willmott (eds) *Labour Process Theory*. London: Macmillan.

Kronlund, J. and Wigblad, R. (1979) 'Boxholmsprojektet – Om fackliga konflikters orsaker. Del II', Ekonomiska institutionen, rapport nr 83, Universitetet i Linköping.

Metallarbetaren (1982) 'Praktisk demokrati i Luleå: Det tjänar alla på', No. 10.

Schmidt, G. (1974) *Gesellschaftliche Entwicklung und Industriesoziologie in den USA. Eine historische Analyse*. Frankfurt am Main: Europäische Verlagsanstalt.

Schumann, M., E. Einemann, C. Siebel-Rebell and K.P. Wittemann (1982) *Rationalisierung, Krise, Arbeiter. Eine empirische Untersuchung der Industrialisierung auf der Werft*. Frankfurt am Main: Europäische Verlagsanstalt.

Sutton, R.I. (1987) 'The Process of Organizational Death – Disbanding and Reconnecting', *Administrative Science Quarterly* 32(4): 542–69.

Thompson, P. and D. McHugh (1991) *Work Organisations: A Critical Introduction*. London: Macmillan.

Wigblad, R. (1992) 'Utveckling i Avveckling', European Research Unit, Ds 1992:17, Stockholm.

Wigblad, R. (1995) 'Community Turnarounds in Declining Company Towns: A Restructuring Model', *The Journal of Socio-Economics*, 24(3): 463–75.

Willmott, H. (1990) 'Subjectivity and the Dialectics of Praxis: Opening up the Core of Labour Process Analysis', pp. 336–78 in D. Knights and H. Willmott (eds) *Labour Process Theory*. London: Macmillan.

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