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Skills, Qualifications and Training in the Italian Steel Industry: A Case Study

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Global Political Economy (GPE) Research Group

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The aims of the project are to:

1. Promote Lifelong Learning within the European Steel Industry
2. Support workers' adjustment to new ways of working.
3. Promote equal opportunities.
4. Support workers' adjustment to new technologies.
5. Provide workers with transferable skills.

In meeting these aims the project undertook the following:

1. Mapped existing qualifications using new and existing research to ascertain the level of need in new and transferable skills.
2. Developed transnational qualification modules comprising new and transferable skills.
3. Developed an on-line training programme.

The duration of the project was three years, from December 2000 to November 2003.

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The Reports are:

1. New Steel Industry Challenges
2. The Internationalisation of the World Steel Industry.
3. The European Steel Industry: From a National to a Regional Industry.
4. The Changing European Steel Workforce.
5. Skills, Qualifications and Training in the German Steel Industry: A Case Study
6. Skills, Qualifications and Training in the Italian Steel Industry: A Case Study
7. Skills, Qualifications and Training in the Netherlands Steel Industry: A Case Study
8. Skills, Qualifications and Training in the Polish Steel Industry: A Case Study
9. Skills, Qualifications and Training in the British Steel Industry: A Case Study
10. Future Skill Needs in the European Steel Industry
11. Training and Qualifications in the European Steel Industry.
12. The Question of pan-European Vocational Qualifications
13. Equality and Diversity in the European Steel Industry

Skills, Qualifications and Training in the Italian Steel Industry: A Case Study

Introduction

The Italian case study focused on a specialist stainless steel plant in Terni, the capital of Terni province in the Umbrian region of Italy. While a long established plant it has benefited from considerable investment over the last decade, and boasts one of the most modern casting lines in the world. Production has remained high at the plant, but the workforce has been massively reduced over the last two decades. There has been some limited attempt to up-skill the workforce. However, this has been largely *ad hoc* and limited in scope and scale.

The material and analysis presented in this case study report should be viewed in the wider context of the restructuring of the world (including European) steel industry. The European (and world) steel industry has undergone significant adjustment over the last two decades. The changes are, in part at least, due to the deregulation and privatisation of this industry, and coincided with much cross-border merger activity. One result is an increasing concentration of ownership and the refocusing of production within international markets. There have also been other catalysts for change; for example a substantial degree of technological innovation, and an increasing emphasis on downstream activities and customisation. The corollary of these developments is that there has been pressure on companies to create the conditions for further automation and mechanisation of production (not least through significant technological development), as well as to centralise production into fewer facilities. One result of these activities has been a major reduction of steelwork employment, particularly in the advanced industrial countries, but also in the former Soviet Union and Eastern Europe, too. Along-side these shifts, new recruitment strategies and skills and training needs are likely to emerge. It is against this transformative context that the skill needs of the European steel workforce is set. A more in-depth discussion of the above issues is located in Work Package 1 Reports 1, 2, 3 and 4.

The Report is organised in five sections. Section One comprises an account of the company, followed by a more detailed presentation of the plant that was studied. In Section Two an overview of the workforce is provided including a schematic presentation of the managerial and work organisation. Section Three examines the skills, qualifications and occupational profile of the plant. In Section Four the training profile is reviewed. In Section Five future skills needs are identified.

Section One: Italy Steel Co.

Acciai Speciali Terni (AST) has a long history as a steel producer. Steel production in Terni more generally, is even longer established and dates from the unification of Italy (1861 and 1870 when Rome was included). Although, under the State of the Church both Terni and the surrounding area exploited the production of iron and steel in the XV, XVI, XVII and XVIII centuries, due to the presence in the territory of available energy sources (hydraulic energy first and then hydroelectric energy) iron ore and lignite. Officially, the plant at Terni was founded in 1884 and it is currently celebrating its 120 years anniversary. The Minister of War implemented the construction of the modern and new steelwork in Terni. This site was chosen for development because of its geographical location. Unusually for a steel plant it is located in the middle of Italy's land mass and

it is not particularly accessible. This was to protect the production of steel for the construction military ships against the danger of bombardment from the sea.

Publicly owned since the 1950s, the plant at Terni was part of a move by successive Italian governments, at that particular period in time, to develop a strategically focused steel industry for an expanding manufacturing industry, particularly for automobiles and domestic appliances. More recently, in 1994, the plant was sold off and became a subsidiary plant of what would become the German based steel producer, ThyssenKrupp AG. Subsequently, the plant became the beneficiary of substantial investment. However, whilst over the last few years the future of the plant has looked promising, as an innovative and leading stainless steel producer, it has also begun to look increasingly troubled, with speculation of cut-backs. It these kinds of developments that raise key questions about the skill profile of the workforce and its future.

The Company

For much of its history the plant was a state owned enterprise. Prior to 1987, the company was the major specialty steel producer in Italy, as Terni S.p.A. (Terni). This company was an incorporated subsidiary of Finsider, the state-owned holding company that controlled all Italian state-owned steel companies. Finsider, in turn, was wholly owned by a government holding company, Istituto per la Ricostruzione Industriale (IRI). As part of a restructuring in 1987, the operations at Terni were reincorporated under a different name, Acciai Speciali Terni (AST).

In 1989, AST and other Finsider subsidiaries were merged, as separate operating divisions, into a single incorporated company, ILVA S.p.A.. From 1989 to 1993, ILVA S.p.A. comprised four operating divisions, including the specialty steels division, with operations located mostly in Terni. In October 1993, ILVA entered into liquidation and on December 31, 1993, two of ILVA's major divisions were de-merged and separately incorporated: ILVA's specialty steels business was reincorporated, this time as AST, and the carbon steel flat products business was incorporated as Laminati Piani (ILP).

However, in December 1994, AST became part of an emerging German multinational steel company. It was sold to KAI, a joint German-Italian company whose stock was owned by Krupp-Hoesch (50%) and FAR (50%), a joint venture set up by Agarini (42%), Riva (42%) and Falck (16%). A year later in a re-sale of the FAR holdings Krupp ended up with 75% of the company. There were further changes in ownership and AST became solely controlled by Krupp. Upon the merger between Krupp Hoesch and Thyssen in 1997, AST became controlled by ThyssenKrupp (Stainless)¹.

The plant benefited from considerable inward investment during the late 1990s and early 2000s, as a result of ThyssenKrupp's take over. However, in early 2004 Thyssen Krupp announced that it planned to close some of the operations at the Terni plant. Specifically, the proposal was to stop producing 'electrical steel' (to conduct electricity). If these plans go ahead then it threatens 900 jobs at the plant, 500 directly employed workers and 400 workers employed by sub-contractors at the plant. Crucially among, these directly employed workers were 150 young staff on fixed term

¹ Source: http://ia.ita.doc.gov/remands/ast_remand.htm and <http://ia.ita.doc.gov/fm/summary/italy/00-28043-1.txt>.

contracts (work/training contracts or contratti di formazione-lavoro). After protest, involving the entire workforce and a mobilised community, the company postponed the core decision and renewed the 150 fixed term contracts, which were due to expire at the end of February 2004².

The Plant

The plant is about three kilometres from the centre of the local town, Terni. It is set on both sides of the main road into town, with a roughly ten-foot high perimeter wall. This wall and many of the buildings were painted in yellow ochre. On one side of the road were the furnaces, casting and rolling plants, the administrative block and the research facilities for the plant. On the other side of the plant were the galvanising lines and other related buildings. On both sides of the road the walls that surrounded the site were punctuated by several openings in this wall, which are guarded with varying degrees of security.

On entering the plant through the main entrance, there is a roundabout, with a pond, fountain and flowers. Beyond this space, there is an old two-storey building with a clock tower. To both sides of the island there are low two storey buildings. The immediate impression is of a small neat old town. However, past this small area the rolling mills and furnaces and related buildings were located and one is very much aware that they are in a busy, old and partially renovated steel works. The spaces between sheds and hangars are criss-crossed with rail lines and roadways. The huge sheds and buildings are dated, apart from the new casting line that has been installed, which is a brand new stainless steel hanger. The overall site for the plant is relatively compact.

The plant manufactures stainless steels, magnetic steels and carbon steels and provides hot and cold rolled sheet steel to a sister plant, Titania for the manufacture and marketing of titanium. It also supplies another company in the same group with steel for forgings used in electric generators. Another company on site, Tubificio, manufactures structural tubes and exhaust pipes. There are also two service centres, one in Terni and another in Veneto, in the provincial district of Padua. There were other plants in the group, in Europe, for example a service centre in Spain, one in France, another one in Hungary and one in the USA.

The plant is quite dated, despite investment from ThyssenKrupp. In particular, ThyssenKrupp has invested in the construction of a thin slab casting line, one of the most modern procedures available at this time (see Report Two and Three). As stated:

...an old factory, it has the following characteristics: two thirds of the factory is old and a third has been renovated over the last five years (Union officer, 2001)

Two polyhedral plants that have electric furnaces provide a key resource for the production of steel, each with a capacity of 180 tonnes. A scrap metal dump is located on site, for the production of stainless steel, iron, alloys, and nickel. Two rolling plants are based on the site, one plant for stainless products and another for magnetic, carbon and forgings. There are two continuous casting lines: one curved and one straight. The vertical continuous casting is used for manufacturing magnetic carbon steel and the curved continuous casting line for stainless steel.

² EIROLINE, 2004: www.eiro.eurofound.eu.int/2004/02/feature.it0402203f.html.

There is also one of the newest and innovative casting lines in the world located on the site, a thin slab continuous casting line, for the production of stainless steel, which came into operation on 31 July 2001.

The production area comprises a series of long casting, rolling and galvanising work areas. Located between these sheds are a number of administrative and related work areas, particularly around the main gate area. These included the training facilities and the research buildings, where much of the development for the thin slab line takes place.

A number of administrative buildings, such as the main personnel and training building, are dotted around the plant, across the road that divides it in two. One of these is the Personnel Management offices (E03). The training school is located towards the centre of the main site, in a rather dilapidated and unattractive office type building (E13) – Scuola di Formazione - Uffici Tecnici (Professional Training School). Other administrative and research facilities are located in a series of buildings in and around the main entrance to the site. The research facilities are particularly large, especially when compared with other plants, as stated:

We have a big research department where we have full graduate people. In fact we have a lot of very ...[inventions which have been registered] ...in fact we have the most important technologies for steel in the world, like we have continuous strip casting technologies and others which have been developed by our researchers.We are world leaders in research and development...(Production Manager, 2001)

The electric arc furnaces are at the other end of the site. The building complex housed the furnaces and related equipment for moving the slab and storing it while it cooled down. The process of production in this part of the plant begins with scrap metal that was brought into the plant in dump trucks, and then deposited on the ground in piles outside the furnace building. Huge chunks of scrap metal are then lifted by cranes with grab hooks and dropped into a massive steel bucket. From there it is transported to the furnace area.

The furnaces are huge structures, alongside which is the operations module. The electric arc operates behind massive iron doors, to a background of intense noise. The control module is located level with the arc behind a clear protective window. The 'team' work at a bank of computer consoles, controlling the operations. These modules are usually staffed by five operatives per shift, clothed in green overalls. The maintenance team is located nearby and wears blue overalls; they respond to problems as and when they occur.

Other control pods are located in this area, one of which is for testing and checking the molten metal. This process involves transferring a large bucket of molten steel along a gantry, from which the molten metal is poured into a vat. This vat then slowly tips side-ways. During this process an operator walks across a small gantry and with a long test poker determines the additions of gasses for the steel being produced. The vat then rights itself, a huge lid comes down and the process continues. Following the production of the molten metal, there are a series of stages for the production of slabs, which are cut to length and piled ready for transportation to other parts of the plant. Large piles of slabs are stored on racks, often still glowing red/white, with steam coming off them, at the end of the enclosed area, adjacent the casting lines. There are no barriers or warnings

about the apparent danger of these slab piles, as they awaited transport on the internal railway lines to the next stage in production.

From the furnace area, the slabs are transported to the mills for casting and rolling. These areas of the factory have a similar dated appearance to them, apart from the thin casting line, which has been recently commissioned and built. The mills at AST are typical of mills across Europe, with noise, steam, darkness and light, and much movement. However, unlike other plants elsewhere there are few overhead walkways, which means that operators are frequently in close proximity to the operating lines and their safety compromised. To illustrate, in one of the rolling mills, the procedure is that slabs are reheated and then shuttled along rollers through a tall rolling machine where the rollers reduce its depth. The slab flies backwards and forwards through the roller until it is a fraction of its thickness and many times longer. Further on towards the end of this line the tin slab was coiled in readiness for other treatment in the plant. Workers often stand just a few metres away from this whole process.

Section Two: The Workforce

At the time the case study was conducted (late 2001), the workforce at the Terni plant comprised 2,950 employees: 2306 blue-collar workers and 644 white-collar workers. Most of the workforce lives in and around the provincial centre of Terni. This is a largely Italian origin workforce, with only two or three black workers in the plant. It was a predominantly male workforce, with women working in the ancillary support areas and clerical areas.

While 120 women were employed in the plant, few women are employed in the production areas. However, there was the beginnings of some limited recruitment of women in the production related areas, so that the first female engineer had been employed in the annealing and pickling section of the plant. A production manager described the context of this appointment, as follows:

The women are very few. Most of them are in administration, personnel, commercial. There are some trials in engineering in the cold stainless steel production area. She is responsible for the annealing and pickling section. She is an engineer. She is the first engineer in production with [such] responsibility..... We have other women in engineering and production but not at that level. (Production Manager, 2001)

Another seven or eight women were employed in the production area, as engineers or researchers, working in the 'industrial systems research field'. Overall, most of the women employed in the plant were located in the administrative areas, personnel and commercial sections.

The perception among staff at the plant was that this was a male workforce, and there was no clear view of the number of women working in production areas. One view was that there was no women employed at all in the production areas. As stated:

There are no women in production. The women in the company are in sales, administration, information technology and marketing. (Training Manager, 2001).

However, in contrast, one of the production managers confirmed that about twenty women in all were employed in these areas (Production Manager, 2001). This situation contrasts with the past,

where a number of interviewees claimed that women had been hired to work in production areas some twenty years earlier, but that this policy had been abandoned. The current position was:

...we have never examined the problem of having a majority or minority of women. We have women in senior management, we have taken on female workers but they have chosen to leave. (2001)

The point is that the predominant perception by many at the plant was that this was a male only production workforce and was likely to remain so (interviews 2001).

Likewise there was a perception that this was an Italian workforce and that there were either no workers from ethnic minorities or very few. One manager commented:

We have some coloured people here but they should be Italian and there are no more than two or three. (Interview 2001)

However, this situation evoked the comment from a union leader:

We are behind in this. In the world, in Europe there are different ethnic groups. (Union Official 2001)

The implication was that the homogeneity of the workforce was unusual, even within the steel industry.

On the age profile of the workforce, there was a similar absence of precise data. Overall, the view within personnel and among managers was that this was an old workforce, with an average age of 50 years. For a number of years the age profile has been increasing, despite the departure of older workers. The principal reason for the upward trend in the average age of the workforce was because there had been no or very limited recruitment of young staff, although over the previous two years, the company had begun to recruit young workers again, after a break of nearly ten years. This shift in recruitment policy led many respondents to remark that the average age profile was falling, following the bunching of the workforce at the higher age levels.

The plant experienced difficulties in recruiting young workers, especially in the technical areas of production. It was noted that it was much easier to recruit into the administration, accounts and finance areas. In general the plant recruits staff into these areas, who had worked elsewhere and were familiar with the work that was required of them (Interview 2001). There was a general concern that new staff for the production areas requires further training and that the plant really was not in a position to provide this for the new recruits (Interviews 2001).

Managerial Hierarchy

The managerial hierarchy was multi-layered, and hierarchical, as indicated below (Figure 1):

Figure 1: AST Managerial Hierarchy

I General Manager			
II Manager I Production	Manager II Commercial	Manager III Administration	Manager IV Research
III Area manager			
IV Department manager			
V Supervisor/Team (Shift) Leader			
Teams (Shifts)			

The managerial hierarchy was such that there were five levels of management in the plant. This hierarchy rests on a multi-level occupational structure (Figure 2), covering both blue-collar and white-collar workers (engineering and related technical staff as well as administration, sales and research). This structure can be presented as follows:

Figure 2: AST Occupational Structure

Category	Nomenclature	Occupations
Category 1.	Dirigente	Managers
Category 2	Quadri / Level 9	Administration, technicians, commercial, personnel
Category 3	Impergiati / Levels 1- 8	Lower level of those in Category 2.
Category 4	Operai / Blue-collar:	Production workers

LEVELS	DIRIGANTE (Senior Managers) (43)	QUADRI (Middle Management) (116)	IMPERGATI (White-collar) (485)	OPERAI (Blue-collar) (2,306)
Level		9		
Level			8	
Level			7	
Level			6	6
Level			5	5
Level			4	4
Level			3	3 (Workers start at this level on training)
Level				2 (This category no longer exists)
Level				1 (This category no longer exists)

Source: Personnel Department, 2001

The two lowest levels of the occupational structure are no longer operative, and nobody is employed in them. In view of this arrangement, over the last few years, workers began their employment on level three (with training) and then moved up through the levels every four/five years. To get into level six (i.e. team leader/supervisor) workers now require designated qualifications. For most (older) workers however, promotion has tended to be on a time-served (experience) basis, following recommendation from managers. In many ways this is still the case. Clearly, there were a number of positions that were dependent from the beginning on qualifications, such as engineering and research positions.

Work Organisation

The workforce was organised in a traditional way, by work group and shift, with little evidence of team based working arrangements. In the main, work was divided functionally so that a work group was employed in maintenance, another on production with other workers employed in quality inspection and such like. However, beginning to cut across this to a limited extent were moves towards a degree of multi-tasking so that in some areas of the plant, production operatives were expected to do some maintenance.

The functional and technically-based form of work organisation evident in most parts of the plant is captured by one manager, who stated:

Our company is divided. One section is Production, another is Commercial, another is Administration...and Personnel. All these categories are divided. One general manager then the manager of for example production, then the manager of the single area, the manager of the department, then there are the supervisors and then the workers. The

maintenance is under the production group like the operatives... It's a hierarchical structure. We have some kind of team in production, between production operatives we have, not maintenance, but the same worker able to do a little maintenance. In the production group the qualification of our workers are in production, quality and maintenance (Manager 2001).

The management used the language of teams but in effect the work was organised on a functional basis. As noted by another manager:

A team is able to manage the production process completely within the context of directives and norms. The work it has to do in a factory consists of small-scale maintenance; as our plants are controlled by processors, the repair cannot be carried out by a person that works on the system, the worker that intervenes, however, must be a specialist. In the past they also tried to introduce a sort of versatility of the operator who could see to the maintenance of the machine while operating it. With the advent of more advanced technologies, electronics, automation, the qualifications of the worker carrying out the maintenance has become much higher and so we were forced to divide these skills within the team that operates the machine. As the level of skill required rises, the degree of specialisation must be increased. (Manager 2001)

In fact the division of task according to shift group has been increasing at this plant over the last few years. This development was explained by production staff as a consequence of the qualifications required for different areas of work. One example was given with reference to maintenance staff:

...for example you asked me what kind of basic qualifications the maintenance engineer must have. We have a good number of young people who have secondary school certificates, and are working on maintenance. This is a consequence of the technology, of the knowledge that is required to be able to operate the machines. (Manager 2001)

This informant who had worked at the plant for thirty years claimed that there was an on-going separation between operators and maintenance.

Thirty years ago, I was responsible for job development within our company. There have never been situations in which there was a particular overlap. An operator has nothing to do with the Charlie Chaplin in *Modern Times*. A team of four or five people is perfectly able to manage a large section of a production process. Given the complexity of this plant and the level of automation, for this person it is not possible to have a further qualification for carrying out thorough repairs. They can only carry out small maintenance activities, for example, checking the oil level of a machine. Once upon a time, in any country, if you broke the machine there was always a mechanic around who could fix the machine with so much as a screwdriver. Nowadays, you need a well-equipped workshop with specialists that are able to do a complete check-up of the machine. This is what has happened in our world. (Manager 2001)

Thus this plant was organised in a traditional way, with the operators working in shift groups, served by maintenance and related shifts.

These production groups were served by maintenance workers who come into the works areas on a 'when needed basis' (Observation, 2001). This pattern of organisation was starkly evident in the furnace area, where the operators' shift group worked in a completely separate unit to that of the maintenance team. It was only when a problem occurred or when routine maintenance work was required that the two shift groups came together. Otherwise there was little intermingling between the two work groups.

These patterns of work organisation were evident in the principal work areas of the plant. Effectively, the workforce was split into different skill groups, albeit on the basis of broad characterisations, such as maintenance, production, inspection and so forth. The result was a fragmented workforce by skill, and a view within the plant that, if anything, this form of skill division was likely to increase. In contrast, the engineers, researchers and related production staff were separate from and not seen as a direct and integral part of the shop-floor form of organisation/operations. Similarly sales, commercial activity and routine administrative work was also organised separately, often in quite distinct and separate buildings on the site.

Section Three: Skills, Qualifications and Occupational Profile

The interrelationship between skills, qualifications and occupation were complex. The organisation of the workforce at this plant has direct implications for the understanding of the skills required. Two features are evident. First, the foundation of skill recognition in the plant is a combination of qualifications complemented by on the job experience and learning. Second, the promotion procedures in the plant, particularly within the shop-floor, and from shop-floor into the staff or managerial levels, were personalised and based on recommendation.

In the main, entry into the plant was based on qualifications, as a minimum requirement. With few exceptions the managerial staff were all graduates, with a range of technically relevant skills. In addition, the company had a leading steel research department on-site, which was central in the development of strip-casting technology. The company is a world leader in these developments. This pattern of appointment and the associated promotion for managerial and related white-collar staff was described by one manager in the following terms:

If we look at an organisational structure, irrespective of the type of company or the department, we normally have a structure with the general manager at the highest level, followed by managers on lower levels, which have different responsibilities. These might also be responsible for the management of workers or other white-collar workers (department manager, production area manager, supervisors). The first level is that of senior management: in our company hierarchy, this is a senior manager, this is a junior manager and these are white-collar workers. If I do not have this position covered, I go out and invest on the labour market. I buy people from other companies. I pay his salary and I take him on as a junior manager because his experience and his ability to be a leader. I take him on as a junior manager. But if I might have an engineer with potential this means that I can't put him in this position immediately, but it will be his development that counts: experience and aptitude. Being a leader: I might have the aptitude, the company is a pyramid, there is one general manager. If I do not have the aptitude for being a leader, I might become a technician, but I won't be a leader. So it's not only a matter of experience. (Manager 2001)

There is thus a relatively subtle inter-mix between qualifications, skills acquired (of a specific type) through experience and then movement through the managerial hierarchy. Clearly there is considerable scope for discretion in this process as the qualities that indicate 'leadership' potential are down to senior staff.

Similar principles operated for the general steel workforce, in production, maintenance and related areas. The skills required for this level of steelwork were defined in terms of qualifications that were necessary for recruitment into the plant and then subsequently the experience gained as a steel worker.

For the white-collars we require all of these skills [for example team working, communication skills, time keeping etc] including, the new one we require is at least one foreign language. For the blue-collars the most important is the technical aptitude but otherwise we require them to be able to work in a team. (Manager 2001)

The situation appeared to be one where white-collar staffs, and particularly those in technical areas, were recruited in terms of their formal qualifications. Once in post, these staffs developed 'skills' relevant for their job. There was little recognition of the broad range of skills that may be appropriate in a modern steel plant.

However, in the case of the blue-collar jobs, the workers were not necessarily qualified in any formal sense, developing their skills through job experience, and if moving to another employer hoping that these experiential skills will be acknowledged. As stated:

The company doesn't give certification that is recognised but it is very useful for the worker. Our younger people that we hire especially with school certificate, after a few years in the company have a bigger opportunity to find another work. (Manager 2001)

For production workers the situation was complex. The workforce hierarchy was formalised into a series of levels, each level carrying with it a skill requirement. Such an arrangement had marked implications in terms of promotion and advancing through the occupational levels. The outcome was promotion on the basis of time served and personal recommendation. This process was described thus:

Personal judgement, evaluations by supervisors. Anyway, the time one must spend in each level before going on to the next level, must be fulfilled. There is a minimum time. It might be four years to go from 4th to 5th level, 5 years to go from 5th to 6th, but this is not enough: a positive evaluation by the supervisor is required. The supervisor submits a written request to the human resources department for the change of level.

These processes were complicated:

There are six levels that are not supervisors; people that became supervisor automatically went to the sixth level. Selections were not made for the sixth level; they were intended for becoming operator or supervisor, not to get to sixth level. This was a consequence. People that had already achieved fifth level were appointed supervisor, and promoted to sixth

level. However, the selections were for the position of supervisor or operator, but even those who did not become supervisors, passed and went on to the sixth level. Also those who were not appointed and had still done the course, those who had achieved a sufficiently high score. (Manager 2001)

The task for operatives and similar grades of workers was to achieve recognition in a formal way of the levels of expertise that they had acquired. Not only was reaching designated levels a precondition for holding positions such as supervisor, there was also a relationship with structures of remuneration.

One note of caution should be introduced to this account, since the time periods between promotion were formally laid down. The first point to note is that it was recognised that qualifications (albeit informal and company specific) were important:

They are important because the higher the qualifications, the higher the pay. (Panel Interview, 2001)

When asked how worth is demonstrated the comment was:

In clearly defined periods, between one automatic promotion due to seniority and the next, there is a length of time that is agreed upon with the trade unions. There are some jobs that never lead to the top level and others that do. (Panel Interview, 2001)

And:

Being on certain machines that require a certain type of skill, this is an automatic process. We do rotations so everybody can take advantage of a higher level. (Panel Interview, 2001)

Further, the formal occupational structure was somewhat misleading since the lower two levels no longer applied:

1st and 2nd levels that have been abandoned for management reasons. When the agreement was reached, it involved many companies for which at these low levels there were low qualifications; each level corresponds to a model of a professional profile. With regards to the first and second levels, the professional profile is not very elaborate. In our company there are no worker positions with such a low profile. (Manager 2001)

The two lower levels comprised manual workers only and following union agreement these levels effectively no longer existed. The rationale for this change was on the basis of increased skill requirements for the production workforce (Interviews 2001).

More generally, there were problems at the plant in recruiting young workers with the appropriate skills. As a result the plant advertises for young workers with specific qualifications and characteristics. As noted:

We cannot find the skills that we need on the job market. We hire them with diplomas through the employment exchange: we post an announcement with the provincial authority of Terni for people with the following characteristics: he/she must have a secondary school certificate, be under the age of 25 and he/she must have already performed their military service. Those with the requisites listed in the announcement are examined by a commission. We train them as electricians and mechanics. If electricians are required we take people who have obtained diplomas as an electrician or electro technician or those holding certificates from a vocational school with a focus on electrics. (Manager 2001)

There had been limited recruitment to the plant for a number of years, reflecting the reduction in staff that has taken place over the last decade as the Italian steel industry was privatised and restructured.

Section Four: Training

The training provision at the plant was limited. There was a relatively small (given the size of the workforce) and aged training centre on site. The programmes offered tended to be technically focused, although there was some evidence that soft skills were beginning to be taught, although the take up by the workforce appeared to be limited. In addition, the company looked outside for some of its training, particularly for managerial staff. The result was an underdeveloped training programme and provision and a dual set of arrangements, depending on occupational position in the plant.

Training Organisation

Training was formally organised by the Training Section, which in turn was part of the Department of Human Resources (or Personnel). There was a training school at the plant, with little evidence of extensive use. The training school – Scuola di Formazione - Uffici Tecnici [Professional Training School] is in a three storey grey building. The school only takes up a part of the first floor of the building. It comprises a large modern room, which serves as a meeting and seminar room, with seven other rooms. Three of these have PCs and are used only for teaching new programmes to employees who need the training for their job, mainly administration employees. In another room there was, at the time of the case study, one computer and, in addition to a number of desks and chairs, a piece of specialist electronic machinery in a cabinet. In one small room occasional language classes took place, on the wall of this room there was a map of the UK. The remaining rooms contained desks and chairs. The whole area was clean, tidy and functional.

The training facility was established in 1994, by moving an externally-based school to the plant, following the privatisation of the plant. The approach was described by a manager as follows:

Each training section consists of a general activity and a specific part. The general part obtains its information from books, libraries and the trainer does not even need to be an employee of the company. He could be a university professor, a professional in any other field or an expert on the subject at hand, but when we get down to details, only a technician who spends his or her hours within the plant can be the source for certain types of information. (Interview 2001)

In general, the plant relies on internal trainers (i.e. plant employees) for the training that takes place, usually technicians and skilled workers. However, there was provision for outside trainers to provide courses for specific groups of employees.

Complementing this approach the company works with universities to develop courses that were appropriate for the high level technical work at the plant. The company was collaborating with the University of Perugia in the development of a new technical programme on material science.

In the courses held most recently, we have been conducting an experiment with material engineering in order to create a technical-metallurgical professional...We are working with the university to create syllabuses. The university lecturer comes by car and covers the subject. Together we have created this syllabus to develop this professional profile, as we do not have it yet. (Manager 2001)

Of the first intake of students four were women.

Overall, the training policy in this plant was to provide training that is relevant for particular jobs. By and large this is technical training, rather than training in 'soft' skills. The primary focus of training was defined in terms of technical requirements for producing steel goods. A Human Resource Manager defined his job in the following way:

I define the resources that we need, the types and the characteristics. I can design career paths that you can follow if you want to become general manager of the steel mill. It is necessary that the person involved has the right type of training, that he has experience in the sector - then I define the path. People management is not my job. It is a deliberate choice that the way in which the operation functions, the development of resources, and the selections are technical procedures, and that they are not influenced by individuals. (Interview 2001)

Thus, training was organised in a relatively narrowly focused and job specific way. The provision was targeted on staff in a focused way, depending on the skills that management defined as necessary for the jobs to be done.

Training Practice

As indicated, the training provision had been developed for the range of staff at the plant, from managers to workers. For managers there were courses on 'leadership, accounting and management control' (Training Manager, 2001). For workers, the focus of training was on technical subjects, often involving particular items of equipment. It was stated that the school catered for 80 to 100 people a day, on different courses and programmes. However, most respondents questioned this assessment and there was little evidence that this relatively optimistic account of the scale of formal training provided in the plant in fact took place.

The organisation of training varied between the different categories of workers. There was an agreement on hours and type of training for manual workers. For white-collar workers, training depended on the budget and job 'needs':

It depends two things. First of all blue-collars, to have training it is between the company and the union for the type and the hours.... For the white-collars it depends on the material, it depends on the budget and it depends on a lot of things like what they do..... It is much more individual.... for example the training school will organise a course and it depends on the personal ability to say yes they are going to attend the course.....You have to go to your manager and say you want to go on the course. Or some people ask me: "please I want to attend the school". (Training Manager 2001)

The overall outcome was a relatively *ad hoc* approach to training and the acquisition of skills.

New workers were hired with secondary school qualifications. The high schools were divided into technical/vocational schools and classical/scientific schools. All new workers had a Technical High School Certificate. Once employed at the plant, these workers were expected to sign a contract for 800 hours of training. This training remit comprised 300 hours in the training school learning the theory of steel production and 500 hours of practical training on the job. In 2000 there were 100 trainees at the plant.

However, there was no established certification for company-based training, as stated:

Ah Yes. Okay it is not a diploma in the state sense.... (not a nationally recognised diploma)....but it is a recognition of their presence on the course and a qualification made by a high level teacher, but is not a (Manager 2001)

This training was not transferable in a recognisable or formal way, as noted:

That's right [they are not transferable]. But it is appreciated very much by other steel companies. It is not official but it is transferable (Manager 2001)

When the workers had done their training they received a letter to say that they had completed the course. This training was done at the training school and was job specific, usually taking place when an operator moved to a new area or a new work process was put in place, usually as a result of new equipment being installed.

For established workers, the training was very limited in practice. Nonetheless, one group of workers, those who were trained as electricians and mechanics received a transferable qualification. Why this should be so for these workers and not others was not clear. According to other workers, training basically comprised learning from older or more experienced workers, as stated:

It works largely on the experiences of the older colleagues who in fact handed down the all-important practice of working under the supervision of experienced people. When a new colleague arrives, he is taken under the wing of someone with more experience. This is the case for several workstations. This is really on-the-job training; it mostly involves the practical aspects of the job. (Manager 2001)

This reliance on experience was confirmed by another group of workers, as stated:

Lately, we've been working on the welding of aluminium, and copper alloy. We were not trained in this field. We are doing it on the strength of experience.(Panel interview 2001)

The operators in the furnace area, for example, were trained on the job and had no formal qualifications for the work that they do. The maintenance workers may have had some qualifications in electronics or mechanics but were unlikely to be either graduate engineers or technicians.

Another dimension to the training was that it was generationally based with older workers teaching younger ones. As noted:

Qualifications here are obtained in accordance with the level you're on, but there are no courses with actual lessons. The older persons teach the younger, but without doing any courses.(Panel interview, 2001)

A more systematic approach to this transfer of knowledge had been developed with older staff creating a written archive of work practices for younger workers. Thus, one remit of the Training Centre was to provide a repository of knowledge:

When employees retire after having been working for the company for many years, their skills are lost as well. The aim of the school was that of saving this historical memory for employees before they actually retired. We have created an archive where the various technicians create their memoirs before leaving their active occupation: depositing the corporate culture. (Training Manager 2001)

A more specific example was provided in relation to the skills required in the new production lines that had been developed:

...the new plant: the people that work there are company technicians who were there when the plant was built. Unfortunately, these employees will be retiring before too long. We are asking them to write down all they have had to learn in order to be able to manage the plant in a proper fashion, in the form of a detailed programme. We base the training of newly recruited employees on this material. (Training Manager 2001)

Whether this is a practice that will be utilised by young workers seems however, highly doubtful.

Thus, in practice, the training provision at the plant was based on a combination of the formal and informal. While this combination was evident from the recruitment of young staff into the steelworks, the longer staff were employed at the plant, the more likely it was that any training received would be narrowly technical and that 'learning by doing' became the operative arrangement.

Training and Skills

The training that took place at the plant was limited both in its conception and its practice. In general all workers interviewed confirmed that the training was more or less confined to specific job

requirements. They also confirmed that there was almost no choice or say in what training they did; in every instance it was the supervisor who decided who went on what course and for how long.

Overall, there was recognition that the training programme should be aimed at developing the skill profile of the workforce. Management claimed that training is both focussed and responsive to needs:

Training is specific for the position the person is going to fulfil ...every time the process or a system changes, training must be carried out. (Interview, 2001)

The responsiveness was illustrated by work practice changes that occurred ten years earlier and thus generated a need for specific skills.

If we talk about problem solving we set up improvement teams that did quality cycles, imitating the Japanese, 20/25 years ago...we have used the Japanese experiences that seemed important to us and that could be applied to our situation. The Americans invented the Japanese model anyway. (Interview, 2001)

And, this prompted courses aimed at addressing:

'...problem solving techniques. Pareto, cause-effect diagrams, Ishikawa.' (Interview, 2001).

Some of the dilemmas in the relationship between skill needs and training were evident in the discussions about teamwork. As noted above, the management at the plant had committed itself to the introduction of teamwork and the rhetoric of teamwork practice was quite evident. A manager in production described the approach to team working, as follows:

Well now we speak about team working, what it means is that must be able to communicate and must be able to solve problems by themselves. (Manager 2001)

This comment acknowledged the tentative way the company was recognising teamwork. More precisely, another manager described the process:

We are moving towards a multifunctional worker. An electrician, for instance, also needs to have a certain understanding of electronics. The electrical engineering part is no longer enough because the plants are becoming more and more automated. So in order not to lose the competitive edge, the response times on the machines must be short. The personnel must carry out maintenance quickly and therefore have more knowledge. This will definitely change the type of training as well. (Manager 2001)

More precisely:

First of all we try to make them work in teams because we are very aware of the fact that more can be obtained through synergy than through individual jobs. We divide the technical part from the managerial part, which ranges from the awareness of being part of a team that is the first company in the world to produce stainless steel, therefore to give

them a sense of accomplishment. There are specific seminars on communication, as there are on leadership. (Manager 2001)

However, while the management made these claims the workers countered by suggesting that there had been a move away from team working, as far as their experience was concerned. As stated:

When the company was still ILVA, operations and maintenance were integrated. They were part of the same group, that is to say, there was a structure that included a supervisor, production workers and a shift supervisor. Then there was the running and maintenance team. For this reason the positions of worker supervisor and the skilled worker supervisor were created, because these had to support the shift leader. (Panel Interview, 2001)

Upon privatisation and the initial take over by Krupp:

When we became AST, we gradually began to change organisation, maintenance, etc. They reinstated the title of maintenance supervisor and shift supervisor. Now operations and maintenance are separate, there are the operations shift supervisor and the maintenance shift supervisor. There has been a great change. (Panel Interview, 2001)

Against this background of experience, it is no small wonder that the workforce was sceptical of the claims that team-working characterised the work organisation.

More generally, these workers wanted training and the associated qualifications. As one near retiree stated:

I do think it helps, even for the professional growth within the plant. Nowadays, no-one is admitted without a certificate. We were hired without one but people can only get on in life in general if they study. (Panel Interview, 2001)

Further, it was clear that workers, particularly the shop-floor operatives, were not having their perceived needs met. One group of workers had sought training in the English language. The outcome was salutary:

Computer courses, the English language course. The English course had already been set up, but was only available to technicians and higher positions. The worker had to remain an ignoramus unless he could get a recommendation (nepotism). (Panel interview, 2001)

In contrast, managerial staff received such training. This response suggests a hierarchical approach to training availability.

The situation was strikingly different for non-manual staff. Here new recruits into 'white-collar' employment like Management, Commercial, Finance Personnel, had university degrees as do most Engineers and Technologists. There was provision for block training by consultants or by the university in the training school, or outside the company at another training school, sometimes in Rome. These courses covered organisational methods, human resource development,

communications and team working, part of a programme of up-grading. The aspiration was to make such courses more widely available, although this had not happened to date.

Assessment

The training programmes and provision at the Terni plant were limited and relatively narrowly focused. The facilities were old and inadequate, particularly in order to meet the emerging needs of changing demands. Not only was the organisation of work beginning to change, although in a relatively *ad hoc* way to date, but the changing composition of the workforce, particularly generationally, meant that the needs of workers were also changing. On this latter point, younger workers were entering the workplace with different expectations of training approaches, than their predecessors (in some cases their fathers) had at the same age. In addition, as older workers left the plant they carried with them few recognisable transferable skills.

Nonetheless, these workers, particularly the young, but also older workers, recognised the changing nature of the steel industry. They were well aware that this industry was becoming international in its focus and organisation. It was in this context, that the rhetoric of team-working was very much part and parcel of the way in which these staff described their work organisation. There was a tacit recognition that the structural changes taking place in the steel industry also had implications for work organisation. The problem was that there was no mechanism whereby this shift in approach could be realised.

Section Five: Future Needs

The skills needs of the workforce were evident in a striking way. First, the older workforce, the majority, was skilled at their jobs, as evident from the performance of their jobs. However, this was largely an informally acquired skills profile, built up over time as long-standing workers at a steel mill. Crucial to this process of skills acquisition was a comprehensive process of learning on the job. Second, and in contrast, young workers, or those recruited recently from outside, faced a training vacuum that could not be filled by the process of 'learning by doing'. Rather, the educational experience of these mostly younger workers was such that they had been prepared for a comprehensive formal training experience that was largely absent at the plant. The result was a potential skills needs deficit that will most probably come to haunt the plant in the future.

Skill Needs

The skills needs of the workforce were marked. This workforce was aged and it was unclear how replenishment of the skills base would take place. One of the problems that was raised across the range of respondents was that the company was not training sufficient numbers of young people in relation to the numbers of men due to retire in the near future. It is no exaggeration that this was likely to create a crisis in the future, relating to the transfer of tacit knowledge about steelwork from one generation to another. It was not at all clear how the plant management planned to address this problem, other than recording and codifying in written accounts the experiences of the older workers so as to create an archive for younger workers. As a result new staff faced a daunting and disconnected process of learning their job, one that no longer corresponded to any close degree with prior educational experience, at school, in college or at higher education institutions.

For their part, younger workers argued for the following:

- More learning about the whole process of the plant.
- Computing training
- Languages e.g. English and German
- Health and safety (The most important training issue for the union)

In addition, younger workers also had concerns about their lack of qualifications. They believed that the company should give them more formal training including training in the theory of steel production, off the job in the school, and be credited with nationally recognised qualifications. The likelihood is that the union will be ineffectual in promoting these aspirations and that the plant management will recognise a problem on a too little too late basis.

Accompanying these specific needs, it was clear that the workforce in general suffered from the deficit of training in non-technical, so-called 'soft' skills. Irrespective of whether the work organisation was based on forms of teamworking or not, the workforce had neither the capacity for developing their skills base nor the incentives. In this respect the workforce faced a hiatus in the possibility of broadening their skills base, either individually or collectively. Nonetheless, this was a workforce with considerable informally based skill, as evidenced by the struggles to adapt and acquire skills necessary to operate increasingly complex equipment and machinery. The problem in the long run was that there were limits to this skills base.

Assessment

The situation in Italy is that a minimal training provision is provided for operatives, and most workers would not have such training. There are two points to note about this plant. First, the workforce at the plant was polarised, with a portion, staff and the research support staff, with high level qualifications, while the bulk of the workforce had little more than school education, with little prospect of further training at the plant. Second, the company management, either at the plant or amongst the parent company had made almost no moves to establish team forms of working, with the associated provision of multi-skilled workers. However, the rhetoric of team-working was frequently heard, although it meant little in practice. In this respect, this plant continued to be organised and to operate in a most traditional way.

There were four notable features to the arrangements at this plant that raise questions for future training needs.

First, the training provision offered at this plant was narrow and focused on job specific tasks only. While there was a training school located at the plant it was small, and used mainly by non-manual staff, particularly administrative and clerical staff and some management staff. It was not utilised in any comprehensive and wide-ranging way by the production operators. For these older workers training was something done a long time ago, apart from specific technical training that took place from time to time in the use of new machinery or equipment.

Second, as indicated, the training that took place for production staff was minimal and usually job specific. In fact, the training was generally organised on the basis of 'learning by watching' or

variations of older workers teaching the younger workers. Not only was this a relatively informal arrangements and unsystematic, the few young workers that had been recruited did not like this process. It was felt that it went against the grain of the training that they had received at school and indeed part of any vocational training that may have been done elsewhere.

Third, there was effectively no apprentice training on site or organised in relation to this plant. The result was that the plant must recruit directly from outside. New recruits then signed some kind of training contract for new workers. The training consisted of 300 hours in the plant school doing theoretical learning and 500 hours of practical training in the plant. This relative lack of provision had the further consequence that on-site training also was minimal for these young workers with the implications described above.

Fourth, work organisation, particularly for production workers was traditional. There seemed to be no system of team working in the sense of 'team-working' elsewhere. Some of the production workers said that they did work in a team but they did not mean teams in any conventional sense. The paradox was that one of the most modern casting lines in the world had just been commissioned at this plant but the work organisation was likely to be among the most traditional in the world.

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