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Working Conditions within Italian FCA Group plants

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Abstract

This paper presents the main results of a research conducted on working conditions at FCA-CNHi Group plants in Italy. In particular, it analyses the consequences of the change in work organization following the transformation in the collective bargaining system and the introduction of organizational (Ergo-UAS and WCM) and technological innovations. The paper highlights the critical aspects of these changes from the workers' point of view.

Keywords: Work organization; working conditions; lean production; automotive sector; workers' inquiry.

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1 Introduction

The Italian Trade Unions CGIL and FIOM, together with "Claudio Sabattini" Foundation and "Di Vittorio" Foundation[1], carried out a field research concerning FCA (Fiat Chrysler Automobiles) Group titled "*Il mestiere dell'auto*"[2].

The research consists of three parts.

The first one is devoted to the analysis of competitive positioning of the Group. This strategic positioning relates to a multifold series of aspects: new trends in the automobile sector, new mobility forms within the automotive industry, new propulsion systems (electric vehicles etc.), connected cars and eventually the financial, industrial and market conditions of FCA Group.

The second part has focused on the working conditions and it has been conducted through a massive questionnaire dissemination (9,668 questionnaires collected, of which 7,833 were deemed valid).

The third part is an in-depth analysis of the working conditions, the labour organization, the use of new technologies, the risk of injury, the functioning of WCM and the redesign of the hierarchical structure within Italian FCA plants, realized through 167 in-depth workers' interviews throughout sixteen plants.

Plant	N. Interviews	Men	Women
Carrozzeria Mirafiori	12	7	5
AGAP Grugliasco	10	7	3
SEVEL Atessa	16	14	2
Cassino	17	15	2
Pomigliano	12	12	
Melfi	13	10	3
Pratola Serra	8	6	2
Magneti Marelli Corbetta	9	5	4
Magneti Marelli Crevalcore	8	8	
Magneti Marelli Powertrain Bari	8	8	
VM Cento	14	12	2

Figure 1: Distribution of respondents by plants (FCA)

Plant	N. Interviews	Men	Women
Fiat Powertrain	12	7	5
Brescia	10	7	3
Suzzara	16	14	2
Modena	17	15	2
Jesi	12	12	

Figure 2: Distribution of respondents by plants (CNH)

1. The Research team is made up of: Roberto Bennati, Davide Bubbico, Tommaso Cerusici, Valeria Cirillo, Giuliana Commisso, Daniele Di Nunzio, Lisa Dorigatti, Giuliano Ferrucci, Matteo Gaddi, Nadia Garbellini, Francesco Garibaldo, Marco Marrone, Angelo Moro, Francesco Pirone, Matteo Rinaldini, Emilio Rebecchi, Ivano Scotti, Stefano Valerio. Research materials are available at the web-site: http://www.fondazionesabattini.it/ricerche-1/ricerca-gruppo-fca-cnhi

2. "The car profession".

In particular, the research aimed at investigating changes in working conditions as a result of the application of:

- CCSL (*Contratto Collettivo Specifico di Lavoro*, Specific Collective Labour Agreement): a collective labour agreement, imposed by the former FCA CEO Sergio Marchionne, which led FCA to leave the national bargaining system of the metalworking sector (CCNL-Industria Metalmeccanica). CCSL has never been signed by FIOM-CGIL and as a result FIOM representatives were denied trade union rights, and only a ruling of the Constitutional Court has restored part of it[3];
- WCM (World Class Manufacturing);
- Ergo-UAS system.

This essay is specifically focused on the third part of this research, although the relationship with parts one and two are key. It is particularly concerned with the working conditions and labour organization, therefore its goal is to identify the main features of workers' labour condition in FCA plants and what essentially forms the workers' performance. The research it is based on has brought up ten defining aspects:

1. Collective bargaining;
2. The work metrics computation methods and ergonomic assessment tools utilized;
3. Technological elements;
4. Production mix;
5. Logistics;
6. (Non-)rotation of workstations;
7. Reduction of personnel;
8. Quality objectives (control, certification, etc.);
9. Number of operations per workstation and operational card management;
10. Breaks' organization.

Notwithstanding the strong interrelationships among them, each of these aspects will be analyzed separately.

2 Preliminary Remarks

Work organization, including the time allotted to operators to perform the assigned tasks, saturations and the consequences that these factors have on working conditions have been extensively explored in the industrial relations literature. Workers and trade union delegates, in the wake of the workers' struggles of the 1960s and 1970s, began to develop tools for analyzing and negotiating all the aforementioned aspects. In particular, Cesare Cosi's work that, challenging the work rhythms imposed on Fiat workers, developed a scientific analysis of the times defined

3. The CCSL was submitted to workers' referendum at the Pomigliano plant in June 2010 and at the Mirafiori plant in January 2011. The referendum, organized by FCA, took place in a climate of great blackmail: if the workers did not approve the CCSL, FCA would have closed the plants and transferred production elsewhere. The outcome of the referendum was conditioned by this blackmail but, despite this, the vote showed a strong presence of votes against, especially in Mirafiori. Subsequently it was extended, this time without a referendum, to all FCA-CNH's Italian plants. The CCSL made it possible to impose a different organization of work, such as the one described in this article. Therefore, the FCA-CNH Group workers are not subject to the same national collective agreement as all other Italian metalworkers.

by Fiat. The results of this grassroots research, that summarized the experience of collective bargaining, were collected into two publications (Cosi, 1975 & 1993).

The Fiat "integrated factory project" (1990) also involved a significant transformation of the work management, impacting the reorganization of the production cycle, the just-in-time synchronization of processes, the new forms of worker subjugation and the saturation increase (Cerruti & Rieser, 1991; Rieser, 1997).

As for the implementation of Japanese models of lean production, which also WCM belongs to, a first attempt at their evaluation swinged between an uncritical stance to a more than enthusiastic one, dominated by quantitative perspective.

More problematic readings of the phenomenon have emerged later on (La Rosa, 1989; Coriat, 1991). Explicitly critical evaluations (for example, Revelli, 1993; Dina, 199; Bihr, 1995) have highlighted a possible continuity with Taylorism stressing how the rigidity of the assigned working time, its compression and a worsening of saturation conditions have been aimed at progressively eliminating the "porosity" of the work performance.

In such context the WCM is supposed to absorb the variable and uncertain steps of both internal and external processes through a peculiar time organization, reducing its "overabundance" in the shop floor production, translating the ergonomic improvement by organizational and technical innovations in a greater working time saturation. Such innovation has taken place in a regressive social framework for trade union relations propelled by FCA (Cerruti, 2012).

Despite the rhetoric flattering the efficiency of these new ergonomic innovations, the reorganization of work, resulting from the implementation of lean production models, has caused critical consequences for workers, in terms of musculoskeletal diseases and stress, a greater intensification of time and acute time saturation (Fontana & Tuccino, 2015).

3 Collective Bargaining

The trade union agreement of 5 August 1971 introduced the concept of maximum individual saturation on assembly lines: that is, the maximum quantity of workload that can be assigned to each worker in relation to the frequency and specific task performed. It was referred to as "the snapshot saturation." Such concept requires a separate analysis to fully grasp its discreet elements.

First, in the aforementioned agreement saturation was referred to as *maximum* — not *average*. This means that once the maximum quantity of work has been assigned to each single worker, there can be no upward deviation during the shift. Consequently, in the worst case scenario workers would have to work either at maximum saturation, or less. However, an increase above the maximum saturation was not possible during the worker's shift.

Second, saturation was individual: also, in this case, no average value was provided for the entire production line; the shop floor working activity in fact, even if it unfolds in coordination other workers, is first of all an individual burden; hence, maximum saturation must be respected for each and every individual worker. Again, it was the individual saturation that was taken into account and not a line-wise average saturation, therefore the average measure does not apply.

In this sense, the term "snapshot" stands for "cycle by cycle" or, to put it otherwise, "product by product"; this aspect retained special importance in the presence of a production mix (that will be explored later on in this article). Therefore, the so-called snapshot measure of saturation differed from that of the "individual average saturation", in which the workload was

not weighed instantaneously, but as an overall average, using as reference the sum of the shift workloads. It is also different from the "group average saturation", in which the workload is not checked individually, but on the entire workers' group. In fact, in the former one strong differences in workload could be determined for each employee during the shift. In the latter, they could be measured among the different workers in the working group.

As a matter of fact, the 1971 agreement established maximum individual saturations (snapshot saturation) on the basis of production volumes and frequencies:

> In regard to operations on mechanized assembly lines (...) the maximum individual saturation index, over a period of 8 hours, shall not exceed the following levels:
>
> - 88 % for lines with cadence times greater than 4';
> - 87 % for lines with cadence times greater than 2';
> - 86 % for lines with cadence times of 2' and infer;
> - 84 % for lines with cadence times of 1' and infer*.

On the other hand, the CCSL FCA-CNH (2010) overrode the above regulation. From the point of view of work organization it is simply established that:

> In order to ensure that production systems are able to meet international standards of competitiveness, on the one hand, the technologies and products will be improved and, on the other, the levels of work performance will be enhanced, deploying the methods provided for by the WCM and Ergo-UAS system or by other specific systems in relation to the types of process, product and technologies applied.

From the point of view of the workstation balancing, it is stated that

> The quantity of production expected to be carried out for each shift, on each line, and the correct production/employee ratio will be ensured through the internal mobility management from area to area in the first hour of the shift in relation to any missing workers or, during the shift, to cover losses resulting from any technical and production disruption.

The interviews carried out in the various plants show how the cancellation of the trade union agreements was one of the main elements contributing to the worsening of assigned working schedules and rhythms. In fact, the so-called "maximum individual instantaneous saturation" — which measures the maximum amount of work that can be assigned per employee in accordance to the cadence of the line — had been referred to as a buffer for many workers, who reported that, as the old system would be replaced "*you'd have nothing to negotiate with*".

4 Ergo-UAS System

The Ergo-UAS system integrates an ergonomic risk-factor assessment tool with a work-metrics tool. The checklist (Eaws[4]-Ergo) determines the ergonomic risk level of the different workstations. Once this is done, the integration with the metric part (UAS[5]) takes place through the

4. European Assembly Work-Sheet

5. Universal Analyzing System

attribution of the overall "increase factor", whose components include an ergonomic aspect and technical and organizational one: such increase factor is applied to the timing derived from the tables MTM[6] 1. The UAS, in fact, is a system with predetermined times: each movement constituting the worker's task is assigned a time value. The time assigned to each workstation is compounded by MTM 1 time-value and the ergonomic increase factor. There are many issues concerning the application of such system.

First of all, the MTM-UAS system assembles and compounds elementary movements in more complex actions: for example, the movements reach-grab-move-rotate position-release are reduced only to take-position. To estimate the frequencies, in fact, the OCRA method[7] measures the "technical actions", whereas the Ergo-UAS calculates the so-called "real actions" which, in some cases, adds up to 3–4 OCRA-measured technical actions.

Ergo-UAS confers workstations a different colour: green, yellow and red. Each of them, respectively, corresponds to a different risk index (0–25: absent-supervised; 26–50: average; over 50: high). The Eaws values are then assigned, through a peculiar measure table, an ergonomic increase factor compounded with the technical-organizational one (always equal to 1%; whereas previously it was possible, through collective bargaining, to obtain a higher value), in order to determine the total increase factor.

Compared to the 1971 agreement, the increase factors provided for by Ergo-UAS are far worse (i.e. lower) in regard to "not uncomfortable" postures and, in particular, for the erect postures, namely those that compel workers to stand up while working. These ones are in fact the most common postures. For example, while the 1971 agreement for an upright posture assigned a value of 5–6%, the Ergo-UAS system assigns an overall factor of 1% (0 ergonomic factor). The values of Ergo-UAS, compared to 1971, are higher in number for "uncomfortable" postures.

The risk brought about by Ergo-UAS is obvious: by making the workstations appear as "not uncomfortable" — or by improving their characteristics to make them fall back into low Eaws values — the increase factor is drastically reduced, so that saturation is intensified. In fact, the Ergo-UAS system — from the standpoint of frequencies of actions, estimation of incongruous postures, handling of loads and complementary factors — makes it possible to considerably reduce the risk assessment of a workstation.

In addition, from the interviews carried out, it is possible to state that:

- the colour of many workstations, and, as a consequence, the application of the corresponding increase factors, is usually a matter of dispute;
- this leads to very high saturation, which are clearly worse off compared to the previous situation, prior the application of the Ergo-UAS;
- despite the rhetoric concerning the improvement of the workstations' ergonomics, many of them are still very problematic;
- the apparent improvement of the ergonomic aspects of a workstation is thwarted by the rhythms intensification and the increase in workloads and saturation.

Furthermore, the main findings of the in-depth interviews are consistent with the results of the quantitative survey carried out via questionnaires: among the worst factors of work performance we find precisely the increase in workloads (about 60% of total respondents) and the increase in work rhythms (about 50%).

6. Methods-Time Measurement

7. OCRA (Occupational Repetitive Actions) is an analysis tool to identify the risk index at the workstations

As far as the workstation and ergonomics evaluation, following the introduction of the Ergo-UAS is concerned, only 17.8% of the assembly line workers believe that there has been an improvement (whereas about 40% indicating a worsening); while the evaluation of times leaves no room for misunderstanding: the 77.3% believes that there has been a worsening; similar percentages emerged regarding the worsening of workloads (78.1%) and physical and mental stress (79.1%).

In the WCM, the identification and elimination of those activities that the system classifies as "No Value Added Activities" (NVAA) occupies a central place. In order to eliminate the NVAAs, the company displays and classifies all the activities carried out by an operator; among these, it identifies the "value-added" and "non-value-added" activities; it measures the latter and defines interventions to shrink them as much as possible — or even eliminate them altogether.

The main NVAA activities are those involving observing, walking, bending, checking. However, a more in-depth analysis allows to identify them with greater precision: walking, waiting, rotating, attempts to screw-assemble, insert-positioning, hand passage, laying tool, put in place, search, count, replace, order, measure, choose, arrange, untie, lift, push, pull, etc.

It is evident that among the activities deemed as non-value-added, there are several that, if can be considered as "downtimes" for the company and therefore be eliminated, are forms of micro-pauses for the worker — both physically and mentally.

"Cost Deployment" is one of the main tools to "attack" NVAAs and one of the technical pillars of WCM. These cost reduction measures are aimed at defining intervention plans to reduce losses, over work organization due to "wastes", including those that are activities with no added value. The analysis concerns each specific area, within which losses and wastes in all processes and sub-processes are identified. Wastes and losses are calculated in terms of costs: for example, the "waste" in terms of time in the performance of NVAAs is recorded as time subtracted from production, and then evaluated in terms of the company's budget as a cost to be eliminated.

It is worth underlining how Cost Deployment focuses on the labour factor. In addition to the NVAAs proper, all moments in which operators are not engaged in activities creating added value (for the company) must be identified and estimated: waiting times (for instructions, materials, etc.), absences (also due to strikes or training, etc.), re-workings, errors, desaturations (conceived as the difference between the frequency imposed on the line and the cycle time of operations).

The WCM framework is clear, any input that is not utilized should be considered as a loss; therefore, the period in which the "labour input" is not harnessed for the production of added value should be considered as a loss and, therefore, as a cost.

It should also be borne in mind that the technical pillar of "Focused Improvement" requires that the PDCA[8] improvement cycle (identifying the causes of the problem and defining the solutions, applying the solutions, verifying the effectiveness, standardizing and disseminating them) must be continuously repeated in order to find better and better solutions to reducing losses. The NVAAs, therefore, cannot be solved once and for all, but each result achieved must be subjected to successive and continuous checks to identify further improvements, in a cycle that could tend to infinity.

In this way, Muda (waste, everything that does not create value in the process) and Mura (irregularities) can be eliminated to maximize the productivity of the process and reduce waste (costs). For example, waiting times must be eliminated by synchronizing the process and the

8. PDCA (Plan, Do, Check, Act) is a Lean Production and WCM tool that establishes a cycle of planning, action, control and action for continuous improvement.

production flow in its various stages, while movements without value added (for example for the collection of materials or tools) must be eliminated through a new logistics supply and workplace organization.

Fundamental to these objectives are the interventions aimed at ensuring that the replenishment of workstations and the balancing of workloads, especially in the case of production mix, take place just-in-time.

At Mirafiori plant, for example, it has been pointed out that the time reduction introduced by Ergo-UAS has increased the workloads compared to the old system (called TMC-2), notwithstanding the different situations depending on the workstations: in some cases the coefficient of increase has grown from 5% to 0%. In general, the new work metrics are difficult and complex, while those adopted in the past are considered simpler and more immediate to understand.

At the Grugliasco plant, the reliability of ergonomic evaluations carried out by the company has often been questioned: these doubts were confirmed by the intervention of the Public Health Authorities, which contested the company's classification. In the very same plant in Grugliasco there has been a significant intensification of work rhythms and performance due to a greater saturation and the reduction in working times: "*There was a fatigue factor... there was a revaluation of time depending on how you were positioned, your posture, which could even reach 25% and which increased time. Now... there is at most 1%... and the saturation is 99%*".

At the Cassino plant, the working times saturation increase, in some cases, has been estimated in the order of almost 20 percentage points: from 80% in the 1990s and early 2000s, saturations incresead to close to 100%. Also, in this case, the ergonomic evaluation of workstations has been often challenged, in close regard to the minimal presence of red workstations which would signal a high risk-index.

Ergo-UAS system application at the Sata plant (Melfi, Basilicata), entailed a standard in which metrics prevailed over ergonomics, with an exponential saturation increase compared to the previous metric system (TMC2). By assigning additional factors only to certain movements, the system stamps out downtimes without a corresponding reduction in the effort required for the whole operation; the rhythms intensification and the load's increase affect the upper limbs and hands due to the pressure exerted on the body in the assemblage of certain parts: "*In theoretical times they do not calculate that a pressure cap could not enter because maybe a flap moves or bends, because a spring jumps... Depending on the way in which the cap is designed with respect to the embossed bumper, we should be able to insert it in a few seconds. But this really rarely happens...*".

Pomigliano plant's goal is to make 435 cars per shift (meaning 62 per hour) entailing a cycle time of 58 seconds: "*Ergo-UAS has cancelled the downtimes — that do not add any value, but has not given it to the worker but has saturated the work (...) in such a way that you cannot do anything else; any distraction, even a sneeze, can put you at risk that the machine embarks, that is, ends up outside your station...*".

Moreover, the micro-operations to be carried out in the cycle time have increased; for example, "*Mounting the cover of the brushes, in addition to mounting and screwing them equals to an increase of 20%...*".

The comparison with the previous method is revealing: "*At the time of the TMC2 the set on the assembly lines was linked to the presences and in the first half hour it was decided between three levels of cadences: 290, 302, 333 cars; in this way the situation was manageable. Today he starts with 435 cars at 57.93: in order not to find myself in difficulty I arrive first and I make some cars to get ahead with the work...*".

At CNH Iveco in Brescia (truck production), a worker puts forward an interesting interpretation, namely that the company, observing the work of the workers, has realized the existence of time margins that, with the professionalism and experience acquired, were able to earn: "*The implementation of WCM and Ergo UAS have led to a speed-up, which is then the speed-up that the worker conquers over the years of work: this was the point on which the company has played; they have understood that the worker speeds up (...) because at Iveco there was a habit of 'working forward' to have time at the end of the day (about 10 minutes)... removing the agreements of '71, no longer paying the highest cabin but doing the average, not ensuring the mix... have created many problems, many workstations work out of time...*".

In Brescia too, the introduction of Ergo UAS has led to a time reduction, which is revealed by several interviewees in the order of 20%, concomitant with the reduction in staff employed on various lines/workstations.

At CNH Iveco in Suzzara (light commercial vehicles production), the introduction of the Ergo-UAS has had different effects across different departments, but a common effect is the working time reduction. For example, in slabs where "*the effects are less severe*", there has been a reduction in time and this depends "*on the unification of the fundamental actions from 4 — reach, grab, position, release — to 2... the steps that I carry out are always the same, but paid less.*"

The objective of the company is to reach a desaturation of 4.5%; the level of saturation in the various workstations is diversified: thanks to the work done by FIOM delegates in the most difficult ones, such as those involving work with arms above the shoulders, the average level of saturation has been lowered.

In the assembly stations, the average frequency is 3.13 minutes, with a space of 8.5 meters — but, as we will see, the poor management of the mix creates frequent overruns of time and space.

At FPT Turin, work times and rhythms are determined by the company's decision to use the production volume set as the sole reference parameter. This implies the need for each individual employee to adapt to the production pace, based, above all, on his or her own experience; moreover, absences and further workforce shrinkages can lead to the assignment of more than one position to a single employee: "*They always want to manufacture as many engines as possible with as few people as possible... They lack people and they should drop from 210 to 180, whereas many times this does not happen because someone is assigned to two workstations...*".

The same happens in the area of bridges and axles, where the return to the station is no longer recognized. The gearbox area appears to be the most problematic from the point of view of the relationship between target production volume and working time: "*They told us that this line must produce, if I'm not mistaken, 220 pieces, and this somehow becomes an alibi for doing anything...*".

Production, in other words, is an imperative, the benchmark which work rhythms must adapt. In a context of mistrust on the part of workers themselves towards the use of or respect for formalized systems of performance times regulation, the company probably has an even easier game in exploiting those same executive skills developed by the workers in order to achieve production advantages: a similar observation was also expressed by an interviewee in Brescia.

5 Technological Aspects

This section highlights the technological elements in use at FCA facilities that may affect working conditions in terms of increased pace, performance constraint, control and monitoring.

First of all, the assembly operations of the vehicles take place on mechanized traction lines that move at uniform speed or at fixed intervals, which cannot be altered by the worker, with predetermined production volumes and times. The time available to carry out the assigned work is rigidly constant throughout the work shift, and equal to the "cadence" — i.e. the time needed to move the product from one station to another.

The cadence of the assembly lines also affects the times and rhythms of the operators who work to support them, i.e. the employees of the preparation departments (pre-assembly, etc.) and of the logistics of the automatic trolleys.

The use of machinery (welding robots, mechanical processing machines, etc.), operating on the basis of programs that define the cycle times of each operation (machine times), also plays an important role in conditioning times and rhythms of the operators' performance.

The same performance constraints can be seen in all those supports (including mechanical, electronic and digital elements) which, by "guiding the performance" of the operation and incorporating the cycle times, condition times and rhythms.

The digitization and connection of assembly lines, machines and tools allows the start/end of the various operations to be recorded in real time, thus representing a powerful tool for controlling times and monitoring the progress of production; this is also done through the quality control production recording systems.

Introducing elements of computerization and digitization also allows a faster reconfiguration of lines and machinery, thus reducing the time of resetting/reorganization, intensifying rhythms and saturations. When used for tasks of certification/control, they allow a time reduction in the execution of such operations.

If certain technological aids cause slowdowns in the flow, the company does not hesitate to eliminate them, even in cases where they have been designed and introduced to improve the ergonomic aspects of the workstations. In addition, certain technological investments have led to significant personnel replacements with consequent reductions in employment.

At the Mirafiori plant, the introduction of wireless screwdrivers or tablets to replace the old methods of stamping and certifying operations was used to reduce times and increase loads. The digitization of work processes (terminals at workstations, digitally advanced machines) and robotization are relatively extensive. Even if, in principle, technological transformations could reduce physical fatigue, they are instrumental in shortening times, controlling workers and discharging onto them responsibility for certifications, stamping, etc.

These are stamping devices with real-time scanning of the workpiece; remote monitoring and control of the digital torque wrenches; the system for documentation/monitoring/signalling errors and their attribution through photos, etc.

At the Melfi plant, the company removed those ergonomic devices that prevented the lines from adapting to the increase in production volumes: in assembly department, the skiwalk, i.e. the mechanical seat that facilitates the assembly of parts inside the car, was eliminated to shorten the distances between stations — and hence increase the speed of flow.

Technologies responding to the objective of speeding up the flow and serving the operator have been maintained, requiring the worker to carry out tasks auxiliary to the operation of the machine.

At CNH Iveco (Brescia), plans to significantly speed up the pre-assembly of the valve (Euro 6) have entailed the workstation restructuring, which has been equipped with an optical reader that activates a monitor for providing instructions to the operator, and a Poka Yoke system with LED lights that indicates which components are to be used. In addition, a sliding trolley has been introduced in the workstation, whose sliding time corresponds to the working time as-

signed to the operator. In the sheet metal department, the work of the operators is determined by the welding times of a robot, incorporated in the program that presides over its operation and which is called up, depending on the batch (model) to be produced.

The role of the operator is to load the rotating mask consisting of two sides. When the operator loads the first one, the mask turns and supplies the robot with the material to be welded; at the same time the second (empty) side is in front of the worker who can load it.

It is a continuous and repetitive process in which the operator loads the two sides of the mask at the service of the welding robot. The loading time of each side is rigidly determined by how long it takes for the robot to weld: as soon as the robot has finished welding, the mask must turn immediately, and the other side must be already loaded.

From the point of view of working times, "*... the robot is in charge...*": the operator must be able to load the free side in a shorter time than that used by the robot to weld: otherwise, a lack of load is recorded.

A performance monitoring system has also been implemented at the Sevel plant: digitized tools are used to allow real-time recording of operations, and of the workers carrying them out. The presence at the workstation and the utilization of the corresponding tools are increasingly associated with a badge, while a remote control hanging from the neck has in many cases replaced the stamping of paper documents for the validation of transactions. In this case, the company has eliminated the time required to move from the location to take charge of the documentation and the stamp and for its impression on the document: this has also increased saturation.

In FPT Turin, for the most recent equipments — such as gearbox assembly or engine assembly — the technological transformations on the one hand led to ergonomic improvements, on the other hand have transformed the content of some steps of the process. The increase in the level of automation has led to the transition from a production defined as "*almost artisanal*" to a less complex and rich one: "*with the new line and the WCM, the line has been objectified*".

"Objectification" means reducing the manual content of the work activity, which is now ever more in charge of the machines. This also led to an ever more increasing use of technological tools to control, report and prevent any error.

Alongside this mixed scheme of automation/digitalization, the issue of the relationship between the advancement of technology and the progressive reduction of personnel emerges: "*over the years they have installed new machines, some robots, always in the plant where they are, removing a worker in a workstation... More or less in my department there is a third of the people compared to before...*".

At the Magneti Marelli plant in Corbetta (Milan), on the dashboards line, a system for controlling the progress of the process and its various phases, has been implemented, thanks to a screen positioned on each line. In this way, technologists collect production data from their workstations. The machines track the beginning and end of each phase, and carry out their operations on the basis of a time established in their operating programs.

Thanks to the installed systems, it is possible to trace the entire production process and verify whether the cycle times have been respected. Technological monitoring tools have also been introduced in the powertrain department, where production times are essentially overlapped with machines cycle times. The traceability of production is guaranteed by the fact that every twelve pieces the operator has to "shoot" the label of the cover of each of them with an optical reader: this is how the time spent in the production is recorded.

Obviously, in this department as well as in that of the switchboards, operating conditions of the machines affects times and rhythms.

6 Productive Mix

In a production mix system different vehicles are produced seamlessly alternating different weight of options and variables: each kind of vehicle, therefore, has a different weight in determining working times and conditions.

A production schedule respecting the agreed timescales and workloads should include: a) total time calculation needed to produce all types of vehicles assigned to a shift, and verification of its compatibility with all operational tags and related time/saturations; b) correct alternation between more and less "heavy" vehicles, to avoid the concentration of those involving a greater workload in blocks — which would force the operators to build, consecutively, a large number of them.

Poor management of the production mix can also lead to very unbalanced workloads between operators on the same line; this also indicates the difficulty (or unwillingness) of adjusting in-line balancing between workstations.

At the Grugliasco plant, the production mix has to some extent failed, in relation to the higher frequency of special vehicles compared to the mix on which the daily saturation is calculated. Special vehicles require a greater number of operations, and this leads to an intensification of work.

Workers interviewed at the Pomigliano plant expressly used the term "*wild mix*" to highlight the sequences with which vehicles with different levels of onerousness of the work to be carried out are sent to the line. While in the past a car that was more demanding in terms of work was followed by a less onerous one, today this is no longer the case; on the contrary, "*it happens to have entire sequences of many cars that are all onerous and equal*".

It follows that even the cycle time becomes difficult to control in a situation in which the ultimate imperative is the number of cars (435) to be built, regardless of their characteristics, so as to induce to further accelerate the line.

In Brescia plants, all the interviewees underlined the company's inability to guarantee an adequate cadence of the production mix between more and less demanding productions in terms of time and workloads: "*The 1971 agreement provided that the working times were established on the basis of the production that took up the greatest time. Subsequently, this agreement was overcome with a new methodology for calculating time: an average time was calculated based on the production mix*".

In principle, therefore, the alternation of more and less heavy machining in terms of time should be represented in the average machining time. But the application of average time occurs only when the production mix really works; on the other hand, if only or mainly the machining operations that involve the longest times take place, the "average" time is destined to be skipped. This has consequences not only for in-line, but also for off-line processing: in the cabin harnessing department, the average time would be 6.23 minutes, but the disappearance of the production mix has caused a significant lengthening.

This systematic overrun of time implies that, where possible, workers must work in advance to gain time in order to cope with the greater workloads of non-compliance with the production mix.

Also, in the Suzzara plant, "*more or less complex vans pass along the line and enter random series, but the cycle time remains the same. In the past they alternated between vans with a higher workload and vans with a lower one; now they no longer do it...*".

The difficulties of managing different types of product make it difficult to control compliance with saturation. For example, a station can have "*a saturation of 92%, in the mindset*

of FCA, means that, if I have vehicles requiring more than 3.13 minutes, I must also have those requiring a shorter time, so that, in 8 hours, I can fulfill the average... The mess is when the mix comes to a block with above-average times for a certain number of consecutive vehicles... because in the 8.5 meters [the working space assigned to each operator on the line] I have 3.13 minutes... but the exception with the additions makes me work at 3.60 minutes... So for that vehicle I use 3.60 minutes on 9.5 meters, when I go back to the original location the vehicle is already further ahead, so if I'm lucky and I find a car that I can do in the stretch of line that remains to me, then I can stay in time, otherwise you always end up beyond the space in which you should end up. If there are more consecutive vehicles like these, you always go out...".

7 Logistic Aspects

Changes in logistics can be analyzed from, at least, five points of view:

1. The way in which lines supplies prevent the operator from wasting time in retrieving the necessary pieces; if it reduced movements and effort, but has compressed times and increased rhythms and saturations;
2. The plurality of supply forms (deliver, electric trolleys, AGVs, hand-handled vehicles) that often create difficulties for both logistics and line operators (material shortages, delays, etc.), as well as safety problems;
3. The reduction of warehouse availability for the minimization of costs;
4. The poor functionality of tools and organizational models;
5. The working conditions of logistics operators, subject to pressure due to the need to ensure continuous, synchronized and just-in-time supplies to production lines.

In Mirafiori and Grugliasco plants, changes in logistics, in particular in the line's supply systems (with the presence of sequenced materials next to the station and no longer to be taken from the container), reduced supply times and, consequently, rest periods when operators could recover when having to pick up the materials from the container — increasing the intensity of performance. The same thing happened in the Cassino plant where, previously, the need to move from the station to go and look for the necessary equipment allowed workers to mentally break the pace of work, and interrupt its repetitiveness.

At the Melfi plant, parts and components necessary for the various operations arrive at each work station through AGVs (Automated Guided Vehicles), so that the worker does not have to move from the workstation to pick up the component to be assembled: the rhythms and workloads are perceived as excessively intense also for the automation of the line supply system.

The conditioning of the line's cadence on logistics emerged explicitly at the Pomigliano plant too, also from the point of view of safety, where the trolley drivers, having to feed the assembly lines, "*must in turn run, ignoring the speed limits and with a number of trucks for each tractor at the limit of safety...*".

In the Suzzara plant, the company is trying to eliminate NVAAs employing logistics tools. Doll systems have been introduced hooked to vehicles that contain everything necessary (screwdrivers, washers, components, etc.) for saddling, bodywork and chassis. These boxes, prepared in the kitting areas, are brought in line by a small robot; the worker hooks the doll system to the vehicle and for the minutes of the cycle has everything needed in line without having to move.

The Sevel plant has been informed of an element deriving from the company's cost reduction strategies: the lack of self-sufficient warehouses with obvious consequences in terms of the

functionality of the lines and systems; even at the CNH in Modena and Jesi where warehouses are not particularly supplied.

8 Non-rotation of Workstations

The results of the quantitative survey results showed that, overall, only 12.7% of FCA and CNH employees can benefit regularly (daily or weekly) from workstations rotations. This practice, aimed at reducing the operator's effort in particularly heavy workstations, is difficult to implement in the Group's plants:

- for the high number of workers with reduced working capacity (RCL), which implies that many of the less heavy workstations are already occupied. The high number of RCLs makes it very difficult to be able to identify, for each of them, a workstation suitable to their limitations;
- workstations are not always adequate to perform a rotation aimed at improving working conditions (e.g. in some sections of the line the workstations can be all red or in any case, even if classified as yellow by Ergo-UAS, be equally heavy);
- because of the need for the company to provide operators with adequate training, able to cover different workstations; this aspect also implies the issue of versatility, which the company does not seem particularly inclined to acknowledge and improve.

It should also be noted that in some cases the rotation of workstations, rather than pursuing the purpose of improving the working conditions of the operator, is used with punitive intent, or it's a consequence of the poor work organization.

Nevertheless, there exists one exception: at Magneti Marelli in Crevalcore, workers reduced their workload by self-developing rotation processes alongside the various workstations; alternatively, the rotation granted by the managers could mean that there is upstream issue with work organization and workstations workload. A similar observation was also made at Magneti Marelli in Bari, where the rotation of the workstations is related to a bad organization of the activities rather than to a precise choice of the management.

9 Employment Levels Reduction

In many situations, the worsening of working conditions is caused by shrinking staff numbers. The company has scientifically studied and applied systems (organizational, but also technological) aimed at reducing the number of employees to dwindle labour costs. These two aspects — organizational and technological — have proceed in parallel and actually support each other: the workforce reduction induces an increase in workloads for the employed staff; on the other hand, the organizational and technological systems that increase loads and saturations make it possible to reduce employment.

At Melfi, the introduction of the WCM has led to a progressive reduction in the number of workstations on the line, which has been matched by a significant increase in production: from the start of new production (2014) to the present, 60 manual loading workstations in slabs have been eliminated and replaced by automated machines, with the consequent reduction in labour requirements of 250 units (from 1024 to 774) and an increase in average production per shift from 170–180 to about 420 vehicles.

In the Pomigliano plant, in stations not directly involved in the assembly line, the work that used to be carried out by two people is now in the hands of a single person, who has to carry out the two phases, sometimes on stations that are not immediately nearby.

Similar reductions have occurred in Brescia (logistics to support the harness and assembly) and Suzzara (assembly department) plants.

At FPT Torino, generational turnover and new stable workforce hiring are now reduced to a minimum; for this reason, the company makes use of temporary workers in the event of production peaks, especially in the engine assembly areas. A particular reduction in employment has been recorded in maintenance, which is now concentrated only on emergency intervention and no longer on preventive actions. The reduction in the number of maintenance workers pressures them to complete their work as quickly as possible, with consequences on both the quality of their intervention and that of the machinery.

10 Quality Controls/Certifications

The introduction of quality controls and certifications has impacted working conditions from several points of view.

First of all, this choice could be the consequence of a company's strategy described above, aiming at the reduction of the workforce and the transfer of NVAAs to assembly lines workers. It implies an increase in responsibilities and stressed operators who, after carring out production operations, must also ensure the correct quality of the pieces.

Quality objectives, moreover, are very often bent to the needs of production, in terms of quantity, and time compression.

Furthermore, reductions in employment, rhythms, times and saturations to which operators are subject, as well as more general conditions of production organization, often make it impossible to guarantee quality.

Finally, as previously mentioned, the registration/certification systems function as tool for controlling work performance and time/rhythms.

At the Grugliasco plant, any non-conformities should be reported to the team leader who should tackle them, releasing the employee for the next vehicle. However, workers often try to solve problems themselves: reaching out to the team leader doesn't bode well, besides the fact that the team leader is often employed online.

The relationship between time available and production quality is highlighted at Cassino plant where, in the past, the (always relative) desaturation of the workstations, especially during assembly, allowed workers to carry out their operations while paying attention to the quality and conformity of the pieces.

The request to reduce saturation, therefore, has the objective of reducing psycho-physical stress, but also of ensuring the quality of production required by the company management. With time compression this is no longer possible and, in addition, the company has loaded the workers with additional tasks related to quality control (procedures for identifying errors) that aggravate the manual work of bureaucratic tasks of filling in forms on which to indicate, for example, the exact time and reason for the waste (which was previously carried out at the end of the shift).

11 Management of the Operational Card and Related Operations

The operational card is often unavailable to workers at their workstations, so that sometimes it is necessary to request it, but its delivery is subject to delays and incompleteness. The absence of the operational card often makes it impossible to carry out a preventive check of the workloads in case of variations in production (balancing).

Even where the tag is present and available to operators, team leaders and other hierarchical figures can modify it informally and unofficially by inserting additional tasks with respect to those formally foreseen: this informal (and often arbitrary) management of tags, besides increasing workloads and saturations, makes it more difficult for delegates to control them.

The card, sometimes, is also informally managed by the operators who, in order to ensure the assigned production volumes, are forced to operate without full compliance with the procedures. This practice is tolerated, if not even encouraged, by the team leaders to achieve the production objectives, but in case of problems or errors, the responsibility for these choices falls entirely on the operators.

As seen above, additional operations also include those relating to quality controls/certifications.

Even when the operational card is unavailable, some tools (electronic scoreboards, Andon, etc.) are present in the departments allowing the Company to control in real time the status of production (delays to scheduled, etc.) configuring themselves as control tools. On some occasions, the availability of the operational card turns out to be an important tool for control and intervention by trade union delegates.

At the Mirafiori plant, the trade union's ability to intervene in the definition of operational cards has become much more difficult, especially when the company decides to change volumes and mix of production and, consequently, saturation. In these cases, there should be a preventive check on the change of the operational card also on the ergonomic level, which seems to happen mostly after changes occurred.

On the lines, the card is generally not visible, and even in case of explicit request of individual employees is not always immediately provided. Often, the team leaders change the operational card on the spot, inserting unforeseen and unpaid movements. This leads us to think that the cards show the sequence of operations, but not the times assigned to them. The operator is also assigned tasks of self-maintenance of the workstation in terms of cleaning and tidying up, often carried out outside working hours.

The management of the operational card is very problematic in the Grugliasco plant as well: it is often not present on the workstations and, when required, it is delivered incomplete (without the time of the individual operations) or after a long time. This is perceived as a big difference compared to what happened in the years preceding the reorganization, when the introduction of new operational card was accompanied by a check with the worker representatives and the employees.

In addition to these aspects of widespread informality, respondents also point out a strong component of arbitrariness in the management of operations included in the card: often the team leaders assign operations formally not provided for on workers' cards, intensifying their performance. When cards are challenged, team leaders often take operations away from individual workers and assign them to others.

In the Cassino plant the operators have been charged with the additional tasks of filling in quality control forms, thus increasing the number of operations to be carried out: often these are not recorded on the operational card, but are required by the superior, so the process of den-

sification of tasks takes place partly in the shadows, which aggravates even more the condition of saturation.

This is often a source of friction between employees and team leaders, as well as of stress and anxiety for the operators — also due to the additional responsibilities related to the fulfillment of the indicators: forgetfulness or distraction in the activity of filling in the control forms and certification of the regularity of the processing are perceived by workers as serious errors.

In addition to these operations, there are those relating to self-maintenance of the workplace, which are not included in the card but are requested verbally by the team leader and always outside working hours.

As for Mirafiori and Grugliasco, also in Cassino plant the availability of cards presents problematic elements.

Even where the card is present and visible, most of the interviewees say that it is very difficult to follow exactly the working procedures it provides — and makes it necessary to operate, therefore, in a partially different way to adapt to the timing imposed by the work cycle. However, although team leaders encourage these procedural deviations, if there are problems with machining, which are not necessarily dependent on operations but are more widely attributable to the machining process (defective parts, difficulties in procurement, etc.), workers are often indicted for not having followed the procedures and may incur in disciplinary action.

In terms of additional operations, at the Melfi plant the maintenance of the equipments, after being outsourced in 2003, was re-internalized and rationalized according to the principles of Total Productive Maintenance (TPM): some maintenance functions were thus transferred to the workers of the assembly line, who were given responsibility for cleaning the workstation and minor maintenance of the tools, while the Automated Plant Operators (CIA) remained responsible for checking the operation of the line and intervening preventively on plant anomalies.

At the Melfi plant the same issue can be recognized: determining the operations assigned to each workstation and the times assigned to each operation is increasingly challenging for both workers and union delegate. Such problem seems to be caused by the continuous improvement process aimed at eliminating activities with no value added, that constantly redefines the conditions of work performance.

Also at the Melfi plant, informal and partially non-compliant management of the procedures that workers should follow is tolerated, always in compliance with the objectives of maximizing production and speeding up the phases; for example, avoiding the use of ergonomic aids (for example, hoists and partners) in order to remain within the limits imposed by the line's frequency. Cards are not present at workstations, and even when requested by workers or delegates, team leaders and supervisors tend to postpone delivery or deliver them incomplete in terms of operation times. Since workers have to perform multiple operations not accounted for in the technical time of performance, they are forced to speed up the pace so as not to risk blocking production; moreover, the distribution of work between workstations based on the set is managed in an informal and arbitrary manner by team leaders and supervisors.

Workers interviewed at Pomigliano also pointed out that "*the work card for each workstation should be made available to the worker: formerly the situation was clear, you knew what you had to do and when. Today, if you don't get stitched up, they won't give it to you, and you depend on the boss who, for example, adds a detail that wasn't on the card*". Instead, there is a scoreboard that indicates the level of production of vehicles, showing whether or not the planned activities are achieved.

In the few plants where the card is present, it is fundamentally useful for union agency.

For example, in the Suzzara plant the operational card is available, and it is an important tool for worker representatives to intervene in verifying compliance with the cadence, saturation and tasks assigned to operators. It contains: the cadence, the operations to be carried out with time for each of them, the number of pieces to be made, the types of vehicles, the total working time per shift.

But there is also a scoreboard (Andon) in which one can see four items: daily production, what is being produced at that time, production achieved in compliance with the planned production, numbers at fault. Other boxes indicate anomalies, calls from the team expert, etc. The production level control system is carried out by means of a sensor which, at the end of the line, reads the vehicle transit; the overall and progressive count is updated every three minutes. This is a strong tool for putting pressure on workers.

At the Sevel plant, working times are no longer available, contrarily to what used to happen before the CCSL. The only way to access the working time would be to take part in the special committee provided for by the CCSL, which as such is denied to the FIOM-CGIL delegates. It should also be noted that the delegates of the other trade unions (the signatories of CCSL) do not appear to be able to handle the information provided to them. Overall, the particularly high frequency of assembly lines often leads to non-compliance with the work cycle, an essential condition for respecting the workload assigned, which is particularly burdensome to assembly.

At the Magneti Marelli plant in Crevalcore, despite the fact that card is available, it lends itself to informal management to allow workers to intervene on variances and anomalies even with tools and autonomy that would not be formally allowed, in order to achieve the quantitative objectives. This informal action, as the workers themselves point out, can also result in problems if their interventions are not positive, but no hierarchical interventions are reported to discourage operational encroachments, because the quantitative results (volumes) are achieved by far.

Others, on the other hand, adhere to what is prescribed by the cycle and report any problems without going beyond the established boundaries of their role's autonomy. Working with low levels of support, using or building small tools, learning to regulate a process trying not to make major mistakes increases, as a worker observes, "*the fatigue in the head*".

12 System of Breaks

At the Mirafiori plant, the transition from individual sliding breaks to collective breaks — 3 consisting in 10 minutes each — means that the areas used for the breaks bathrooms, coffee machines) are subject to crowding, which makes it difficult to take advantage of the break itself. For example, for some stations, the distance from the canteen is such that a good percentage of the break time is used to get to the canteen rather than eating.

The workers of Grugliasco point out that the breaks provided for by the CCSL are not sufficient to ensure adequate psychophysical recovery. Even in this case time and space do not afford the use of it even for the crowding of bathrooms, coffee machines, etc.

Also in the Cassino plant the time of daily breaks (3 by 10 minutes) is considered insufficient to take advantage of the services and recover; moreover, the fact that the canteen break is now at the end of the shift, rather than in the middle of the day, has in turn reduced the possibilities of rest, preventing to break the working day. In addition to compressing rest periods, the remodeling of breaks also seriously compromised daily interactions between colleagues at work.

The same problems can be found in the Melfi plant, where workers complain that during the 10-minute break they are forced to choose between going to the bathroom, sitting "*to take a breath*" or going to the vending machines for drinks and snacks. Since toilets are few compared to the number of people and often located at the ends of the wards, during collective breaks there is a frenetic movement that actually prevents any exchange of social relations. In addition, some assembly department supervisors and team leaders are used to decide unilaterally whether to give the collective or sliding break, depending on the need to recover production as a result of flow slowdowns or technical failures.

Also in the Pomigliano plant, in case of production delays there are consequences on the breaks: "*the team leader delays the collective stop by up to 14 seconds, without communicating it. If this is not enough, then, there is half an hour of recovery at the end of the shift and if you refuse, you run the risk the next day of finding yourself in a difficult position. In case of need you have to call the team leader by pushing a button, but the decision whether to grant the break or not is the team leader's...*".

The company pushes to create a bond of friendship or camaraderie between the workers and their team leaders and "*many feel conditioned, try not to make the call, not to ask for replacement to go to the bathroom to not upset the team leaders...*".

At the Sevel plant there are similar problems: in collective breaks, the short time available and the crowding of toilets and relaxation areas induce several workers not to move away from the line, some even give up going to the canteen (given the distance) to eat at the edge of the line.

13 Conclusions

Working conditions and work organization at the FCA-CNH Group's plants have changed dramatically with the introduction of the new collective labour agreement (CCSL), and the implementation of the WCM and Ergo-UAS systems.

Working conditions have negatively changed for workers in terms of working times, pace, workload, saturation, etc.

All possible tools — organizational changes, time calculations, ergonomic evaluations, logistics, new technologies — are used to enhance work performance and increase productivity.

The exercise of fundamental trade union rights in defense of working conditions is denied or, at least, severely restricted.

Despite this strong increase in productivity, achieved through a heavy intensification of work performance, FCA's market conditions have not changed at all; on the contrary, from the sales point of view, the Group continues to record worrying losses of market share.

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