

MANUAL
**60 AGAINST
& WASTAGE**

Commemorative Edition
Ferrovial's 60th anniversary.

The "Manual 621 Contra el Despilfarro" was originally published in 1962

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FOREWORD

In 1962, ten years after it was founded, Ferrovial had 500 employees and annual revenues amounting to 126 million pesetas, equivalent to 25 million euro in constant terms.

That year, Rafael del Pino y Moreno, the company's founder, commissioned this *Manual 621 Against Wastage*, one of the procedure manuals that the company issued in the first half of the 1960s. They provided all Ferrovial employees with standard criteria for the proper management of the resources at their disposal, both material and human.

This 'Manual Against Wastage' could well be renamed 'Manual for Managing Talent, Efficiency and Innovation'

At a time when there were few business management books available in Spain, and very few companies had standardised internal procedures, these manuals proved invaluable. They also had a major impact outside the company, as other companies and institutions soon published manuals inspired by Ferrovial's.

Although half a century has passed, this little book is still valid today. Perhaps because it is packed with common sense, this manual is a compilation of the essential, timeless knowledge required for professional business management.

Apart from its striking title, its old-fashioned wording and the numbers in pesetas, the manual contains many modern ideas on resource, inventory, project and time management.

In fact, if we were to update the title, this *Manual Against Wastage* could well be renamed *Manual for Managing Talent, Efficiency and Innovation*.

Talent, because it encourages managers to motivate employees, enhance their specific skills and give fair recognition for their efforts; efficiency, because it shows how to meet objectives at the lowest possible cost by optimising processes throughout the chain; and innovation, because

it establishes mechanisms for continuous improvement in all areas and encourages everyone to contribute towards achieving this goal.

Talent, efficiency and innovation are the qualities that have guided Ferrovial for the last 60 years. They are part of the company's DNA and are largely the reason for its steady transformation into one of the world's leading infrastructure and services companies, with 70,000 employees and a presence in 15 countries.

Ferrovial currently manages some of the world's most valuable transport infrastructures, is a byword throughout the world for engineering and innovation in intelligent cities and infrastructure maintenance, and is committed to society and the environment, not least because we continue to implement the teachings of this manual.

We have re-issued the manual in order to share a fragment of Ferrovial's history and pay homage to its founders' vision.

Rafael del Pino Calvo-Sotelo

Chairman

THE FERROVIAL MANUALS

In 1958, after six years in the railway business, Rafael del Pino decided to expand and Ferrovia moved into construction. As a realistic, prudent engineer, he was aware of the company's shortcomings in this area, and he sought the necessary tools to ensure success.

One such tool was to ensure the best possible organisation at all levels. The Manual puts it aptly: "Good organisation is the best weapon against wastage, as it will have no dark corners in which to hide. On the contrary, good organisation makes negligence almost impossible as any carelessness is very quickly brought to light".

To fulfil this goal, in the 1960s del Pino asked co-founder Ramón González de Amezúa to draft a series of guides to harmonise procedures in individual workplaces.

Thus came into being the Ferrovia Manuals. Between 1960 and 1965, close to 40 manuals were produced on a range of topics: accounting, payrolls, machinery handling, personnel management, design and filing of forms, etc. There was hardly any area of the company's activity that did not have a manual.

To ensure that their message would be readily grasped by all, the manuals were short and written in plain language. They were printed in very rudimentary editions, with print runs of about 150 copies to ensure that there was a copy at each workplace (of which there were about 100 in Spain at the time). Employees knew that the manuals were available for consultation in the characteristic steel filing cabinets that were installed in every Ferrovia office or site.

To make them even easier to locate, each manual was numbered with a 6 followed by a sequential number based on the order of publication. In this way, the manuals could always be found in section 6 of the filing system.

And they worked: in their time, the manuals served as an essential reference work for employees in everything they did. Workers at Ferrovia knew that forms came in three colours; blue forms could be discarded

once read, whereas green forms had to be filed. On arriving at a different site, an employee knew exactly where to find materials in the warehouse, since they all applied a uniform storage system.

Such manuals are standard practice in companies today, but very few companies in Spain had them at the time, and even fewer applied them with the constancy and dedication that prevailed in Ferrovial.

Ferrovial's Manuals became well known throughout the industry. A number of companies drew inspiration from them and implemented similar approaches. The Spanish Ministry of Public Works asked for permission to adapt some of the manuals.

Ferrovial stopped production of these internal manuals in 1965, when it decided to engage an outside consulting firm to apply international standards to its procedures.

Ferrovial's Manuals became well known. A number of companies drew inspiration from them

Today, the manuals are a curiosity that illustrate how Ferrovial forged its unique, innovative corporate culture from the outset.

Manual 621, Against Wastage, is a very good example.

As its serial number reveals, it was the 21st volume in the series. It was written in 1962 with a view to making the most of potential capacities, both material and human, in all areas of Ferrovial. To that end, it was necessary to combat wastage, which, to quote the manual "is like the mythical Hydra, which grew two heads for every one that was cut off".

This manual's peculiarity is that it does not refer to a specific discipline, such as accounting or machinery maintenance; rather, it is applicable to wastage in all areas: from warehouse management to personnel.

For that reason, Manual 621 condenses many of the basic principles of optimal resource management that can be found in modern management texts and are taught in business schools today.

RAFAEL DEL PINO Y MORENO, FOUNDER OF FERROVIAL

In order to understand the history of Ferrovial, it's necessary to know something about Rafael del Pino y Moreno, the man who founded the company and was its chairman for five of the six decades in which it has been in existence.

He was born in Madrid on 10 November 1920 into a family with a long tradition of engineers; from an early age, he acquired the family's distinguishing feature: the spirit of hard work. His personality and work ethic were forged by Colegio del Pilar secondary school, where he studied until 1936; the army, which he joined in the turbulence of the Civil War; and the Civil Engineering School, where he studied from 1941 to 1947. "We will get nowhere if we don't strive to excel, to surpass our goals," he would say.

Upon graduation, del Pino entered the railway engineering business. After five years, he travelled to France, Germany and Austria to find out about new materials, technologies and management methods. He returned to Spain with the conviction that he had to start a new company using the technological advances he had discovered in other countries in order to enhance productivity.

So, at the age of 32, del Pino founded Ferrovial. He started with an idea—to manage his own business—and an opportunity, provided by a one-year contract from Renfe, the Spanish national railway company, to fasten railway sleepers. To undertake this venture, he had the support of direct family and some friends, who put up one million pesetas (equivalent to 300,000 euro in current terms) as initial capital.

Rafael del Pino was not a tech entrepreneur of the type that proliferates today, but he had many features in common with them, since his success was due to initiative, creativity, method, measured risk-taking, and vision. That vision took him to Venezuela in 1954 and, above all, to Libya for a road-building project in 1978, at a time when other Spanish construction companies were focused entirely on the domestic market. That foreign project was the first step in Ferrovial's successful process of international expansion.

Del Pino was convinced that one of the decisive factors in business, and in life, is “knowing what people are capable of, which is normally more than might appear at first glance, and putting the right person in the right job”. For that reason, he had a unique ability to create and manage teams—another key factor in Ferrovial’s success.

His constant concern for people, talent and the organisation of work went beyond Ferrovial and led to numerous projects that sought to improve society and defend business freedom. As a result, he was a founder member of Asociación para el Progreso de la Dirección, Círculo de Empresarios and Instituto de la Empresa Familiar, among other initiatives.

In 2001, when he told the shareholders of Ferrovial that he was stepping down as Chairman of the Board after more than four decades, he joked that he was leaving the company in good hands (those of his son, Rafael del Pino Calvo-Sotelo and the Group’s executive team) because he had a good offer to occupy his time until he turned eighty.

Rafael del Pino succeeded on the basis of initiative, creativity, method, measured risk-taking and vision

Everybody knew he was referring to the foundation that bears his name, which he entrusted with the task of “contributing to the improvement of knowledge among Spanish managers so that they can successfully develop their initiatives and skills”.

Within a few short years, the Rafael del Pino Foundation has established itself as one of the most active and influential foundations in Spain, continuing the work of one of Spain’s most notable businessmen.

Writing about Rafael del Pino, historian Mercedes Cabrera described him as “a tireless but reserved worker, who could focus on the tiniest detail, and who managed with a firm hand”. These were some of his defining features: his ability to lead and take risks, his concern for innovation, his obsession for financial independence, for reinvesting profits and ensuring liquidity, and his firm, constant commitment to austerity.

Those principles are still core values of Ferrovial, sixty years after its foundation. They are the mark which the company’s founder left, on the basis of his example.

SPAIN AND FERROVIAL IN THE 1960s

Manual 621 *Against Wastage* was written and distributed in the early 1960s. At the time, Spain was beginning a new economic strategy, called the “Stabilisation Plan”, which had been approved by the Government in 1959; it introduced a free market economy, while allowing the peseta to be exchangeable, paving the way for foreign trade. It marked the end of two decades of the economy being closed to the outside world and sought to give Spanish business the necessary flexibility to acquire raw materials, technology and finance. The plan opened the door to modernisation and prosperity.

This new approach, referred to as “desarrollismo” (developmentalism), provided Spain with an extended period of intense economic growth coupled with expansion of the middle class. Industry made a contribution to the process, particularly due to the establishment in Spain of multinational companies. Between 1960 and 1973, Spain's industrial output expanded at a compound annual rate of 10% while productivity also improved notably. Construction expanded in both public works and buildings, where there were notable deficiencies; services also grew, particularly tourism, now one of the main contributors to GDP.

It was also a period of profound demographic changes, as three million people left the countryside and moved to cities, shifting from agriculture to jobs in industry and services. The population expanded from 30.5 to 34 million people in the 1960s, even though 2 million Spaniards emigrated to Europe and the Americas, their remittances helping to control the balance of payments deficit. The emerging middle class demanded consumer goods, including cars. The Seat 600 became a status symbol, as did home ownership. Between 1961 and 1975, Spain's per capita income increased by 6% per year on a compound average basis, i.e. double the European average, enabling Spain to close the gap that separated it from its neighbours to the north.

FERROVIAL, AHEAD OF ITS TIME

Ferrovia was founded in 1952, with headquarters in an attic in Moreto Street, Madrid, near the Prado Museum and Atocha Station, with an advanced vision of an entrepreneurship. From the outset, the company focused

on efficiency, quality and innovation. The founder, Rafael del Pino Moreno, imported mortising, bolting and tamping machines from Germany, which enhanced productivity, cut costs and improved quality.

These were the first in a series of technological innovations, coupled with methods for managing, motivating and involving professionals, that would characterise Ferrovial. This was demonstrated when the company laid 30 kilometres of track in 30 days in the approaches to Madrid, to the amazement of the main contractor and the railway company; as a result, Ferrovial forged a reputation as a reliable contractor. Ferrovial and Telefónica were the first Spanish companies to introduce computers; Ferrovial was also one of the first to introduce flexi-time and meal vouchers for employees.

The 1960s, when this manual was published, was a decisive decade for Ferrovial

In the early 1960s, Ferrovial had over 500 employees on the payroll, and it had expanded from railways into water and road works. Towards the end of the decade, in 1968, the company passed a decisive milestone: the Bilbao-Behebia toll road, which required a combination of technical expertise and financial capacity.

The construction, operation and maintenance of the Bilbao-Behebia toll road was a new departure for Ferrovial, and required it to develop a new skill set. It also involved working with international partners.

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At the end of the 1960s, Ferrovial was considering other international ventures, particularly in North Africa, the Middle East and Latin America, where it bid for civil engineering projects (both roads and railways).

Ferrovial's character, which has been a constant feature throughout its six decades of history, is the result of the will and experience of those early years, when it was still a small family firm.

Fernando González Urbaneja
Journalist

MANUAL

7 AGAINST 2 WASTAGE

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INTRODUCTION. PURPOSE OF THIS MANUAL

This Manual is not an attempt to provide a comprehensive catalogue of wastage in all its forms, nor is it a compendium of remedies against it.

Unfortunately, wastage is like the mythical Hydra, which grew two heads for every one that was cut off. Combating it requires constant vigilance; therefore, rather than a set of recipes and remedies, what is needed to fight effectively against this devourer of companies is a specific mind-set.

Wastage does not refer only to the misuse of materials; it extends to other—less visible—areas which are nonetheless of great importance: time, work, use of plant, authority, etc.

This manual seeks to raise concern among the company's managerial staff by briefly presenting some general considerations on the topic, and a description of the most significant forms of wastage.

With this as a starting point, and the collaboration and suggestions of staff, we can successfully begin this battle, and within a few months, publish a new edition – one that is more complete and based on acquired experience.

Any communication on the topic will be gratefully received. Send your comments to Head Office, with reference number: 621.

Thank you very much.

L.

**THE PHILOSOPHY
OF WASTAGE**

1

WHAT IS WASTAGE ?

Wastage is a loss that cannot be recovered. It benefits no one and is harmful to all. Whether it be materials, time, work or energy, the loss mostly occurs due to disorganisation or negligence. While harmful to both company and staff, the loss does not benefit anyone in the least.

2

FORMS OF WASTAGE

Wastage comes in a multitude of forms and varieties: **MATERIALS** can be wasted because of defective procurement, deficient storage, loss and misuse, or because of a failure to recover them; **SERVICES**, due to deficient contracting or defective control; **PLANT**, due to an excess of machinery, improper use or poor upkeep, or failure to make full use of available hours; **WORK**, due to poor training, carrying out pointless tasks, over-staffing, unnecessary overtime, pointless errands, and uncoordinated and uncontrolled travel. And there is another matter of great importance: there is no such thing as "minor" wastage. Rather, any form of wastage tends to be repeated time and again, steadily accumulating so as to become significant within a short space of time.

3

CONSEQUENCES OF WASTAGE

Wastage corrodes. In serious cases, it can cancel out and actually exceed the benefits of even the best-laid plans. This places the company at a disadvantage with respect to competitors, and renders all improvements and staff satisfaction impossible. Disorder breeds disorder.

In our industry, where margins are always narrow and competition is fierce, wastage can be very detrimental.

4

ORGANISATION: THE BEST DEFENCE

With zealous and competent staff, negligence is rare and occasional and does not therefore generate much wastage. However, if organisation is deficient, wastage can arise even without negligence, and it will mostly go unnoticed. Good organisation is the best weapon against wastage, as it will have no dark corners in which to hide. On the contrary, good organisation makes negligence almost impossible as any carelessness is very quickly brought to light.

II.

WASTAGE IN MATERIALS AND SERVICES

5

PROCUREMENT

This is an area of capital importance, where wastage can arise in many forms. Before issuing a requisition, always check whether:

- The item is not already in stock at the site storage facility.
- The amount requested exactly matches the need.
- The item meets the required quality: wastage often occurs if a product of inferior quality is purchased on the grounds that it is “cheaper”. This can prove to be a waste of money as the product that was purchased may not be fit for purpose.
- The supplier has been selected properly by issuing a request for quotations to a number of suppliers, where this is warranted (See Manual 602).
- The best conditions have been negotiated in terms of discounts and other advantages such as free delivery, favourable payment terms, etc. Purchasers should always ask for discounts, etc., and pursue them keenly, not just routinely.

Do not order more than is needed. Good warehouse records make it possible to avoid overstocking, which has its own dangers:

- The money that is invested carries interest and other costs, which represent an unnecessary burden on the project.
- Merchandise and stock deteriorate and spoil with time due to shrinkage, rust, loss and breakages, decomposition and obsolescence.
- Wastage can occur when merchandise is received. Always check an order on arrival to ensure that:
 - The goods are of the agreed type and quality.
 - No items are damaged or broken.

- The number of items received matches the number on the delivery note or invoice.

Any complaints to the supplier or carrier must be made immediately as a delay may invalidate the complaint.

Untimely procurement is another source of wastage. A project may grind to a halt if the necessary material or part is not ordered in time. The result is that days of work are lost, and the lack of a material or component, which may not be very costly, can greatly disrupt the project and cause damage far in excess of the item's value.

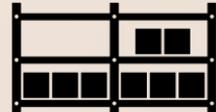
All of this wastage can be avoided with:

- Accurate knowledge and foresight of project requirements.
- Proper selection of suppliers and negotiation of the best possible conditions.
- Good warehouse management, with up-to-date records.
- Careful receipt of all ordered materials and components.

In the case of materials that are inexpensive and not prone to deterioration, it may be advisable to make just one order per year, so as to avoid devoting time and administrative work to minor matters.

6

STORAGE



The word "stock" derives from the Medieval custom of using tally sticks as IOUs. The stock was the part of the stick given to the creditor and was therefore a store of value. What more needs to be said?

A glance at a project's "Inventory" (Form 138) reveals that the balance of the "Stores" sub-account (200) is always very large. It is the "treasure" embedded in the project, and should be treated as such.

The warehouse acts as a “bank” and the warehouse staff are “cashiers”. Instead of managing money, they manage goods (which have, indeed, cost money) whose loss or waste translates into a loss of money. No bank cashier would ever dream of leaving bank notes scattered around any which way, or thrown on the floor, or mixed up with dirty old papers. Therefore, warehouse staff must behave like diligent cashiers, always aware of the fact that the goods in the store are like money in the bank.

We will now summarise several pieces of advice to help you manage site storage facilities properly. These are tried-and-tested rules that are backed by experts in the field. Because storage is directly linked to procurement, some of the following rules were already mentioned in the previous section. Nevertheless, they are included below again for your convenience.

- Order and cleanliness: A disorderly or dirty storage facility is a sure sign of poor management—and a sure source of wastage.

- One floor: Two-storey storage facilities are inconvenient to navigate, increase maintenance costs, and make organisation and proper classification of goods difficult.

- Adjustable shelving: Though more expensive, this style of shelving is preferable as it allows different space combinations and enables space to be allocated according to needs.

- Changeable labels: Instead of permanently marking the shelves, use removable labels, so that they can be changed as required.

- Classification: Except in the case of smaller warehouses, the general system of classification by subject is not always the most appropriate. Four categories of stored items need to be distinguished according to their purpose, and frequently-used items should be stored separately from the rest:

NORMAL STOCK – Items that are used commonly and frequently. These items form the core of the warehouse and should be given preference regarding availability and ease of access.

TRANSITIONAL STOCK – Supplies that are allocated to a particular project and which will not be replaced once the job has been completed. For example: components and parts of new plant or of an installation under assembly.

SAFETY STOCK – Items held for the event of a breakdown, which may happen rarely, if ever. Examples: bearings for a crusher, or an engine crankshaft.

RECOVERED STOCK – Items for re-use obtained after a repair. Once repaired, they may be re-used. However, they must be kept separate from new stock.

STOCK FOR DISPOSAL – Items which, for any reason, are no longer of use to the project. They must be removed from the warehouse and sent where they are needed, or be disposed of.

JUNK STOCK – Items that are to be thrown away. They can be sold to the rag-and-bone man or the scrapyard at regular intervals.

- No useless items: It should be clear by now that items that are of no use should not be kept in the warehouse. They cost money, occupy space, create work and serve no purpose.

- No untidy nooks: Beside many other disadvantages, they are a fire hazard.

- Few boxes: On receipt of deliveries, the boxes should be opened and their contents sorted. Boxes create clutter in the warehouse and disorder when open; if closed they create an artificial picture of the amount of stock.

- Logical stacking: The items that are used most frequently should be stored in the most convenient locations. All liquids, containers, etc. (which may break or spill and damage items below) should be stored at a low level. Bear in mind the nature of the material being stored. For example, items of rubber or plastic should be protected from direct sunlight and stored in cool places where there are no draughts. Bags of cement should be kept in a dry place and be stacked carefully to prevent bags from splitting, etc.

- Easier handling: Keep to hand all the accessories that can make it easy to handle stored items: baskets for carrying goods by hand, trolleys, step ladders to reach high shelves, cable cutters, pumps for decanting liquids, a portable light with a long shielded cable to illuminate any corner or shelf.

- Standardised nomenclature: Always use the company's standard nomenclature and referencing system. Ensure all labels and records conform to it.

- Accurate and up-to-date records: Keep the warehouse records (Form 57) carefully since they are the administrative foundation of the store. Obey the rules on "average prices". Watch the "minimum stocks" with a view to placing orders on a timely basis, considering delivery periods in each case.

- Inventory: The word "inventory" comes from the Latin "invenire" which means "to find". In other words, the inventory is the list of things "that have been found" and not those which, according to records or papers, are supposed to be there. Consequently, stock-taking and physical checks are essential.

Take advantage of a stock check to clean and generally re-organise the warehouse.

7

RECOVERIES

Materials delivered to the project site may be surplus to requirements. It is not unusual to see surplus material strewn around the site for days on end, which can result in spoilage or theft. Always return surplus materials to the warehouse.

When machinery has been repaired, the parts that were replaced can often be checked and refurbished for use in future repairs. They should not be stored in a broken condition: where repair is possible, it should be done immediately and the item should then be placed in the warehouse under the heading of recovered stock.

This should be done only with items where repair is worthwhile. It is costly and counterproductive to retain old, useless items. If they cannot be repaired or re-used, they should be classified as junk stock and processed as such.

8

ENGAGING SERVICES



Services can be quite costly. All points covered above in section 5 (Procurement) are applicable here. Among the most important, we can mention:

- Transport. Choose the most cost-effective method for each delivery. This may not always be the “cheapest” option; rather, it will be the one that is most appropriate to the specific circumstances.

For example: Imagine that a quarry, whose daily output is worth approximately 15,000 pesetas, stops work because a crusher has broken down. The broken part needs to be sent to the manufacturer’s workshop in the city for urgent repair. The part weighs a few hundred kilos and shipping it via a trucking firm or by rail would cost 300 - 400 pesetas, but might take at least 3-4 days. The most cost-effective method would be to charter a lorry specifically to carry the part. Even though the lorry would be three-quarters empty and might cost several thousand pesetas more than a common carrier, it would save two or three days in transport time, which translates into two or three days’ output, equivalent to an extra 30,000-45,000 pesetas of revenues, set against an additional transport cost of 3,000 pesetas.

In the case of regular transport, such as carrying staff to and from the site, and carrying materials within the site, it is well worth negotiating the keenest prices and conditions, since the money saved on a daily basis is then multiplied by 300 each year. You do the sums!

Regarding rail transport, be fully aware of the tariffs as they can vary greatly. If a wagon can be filled, it is much more advantageous since transportation is faster and more direct, and express fees can be avoided.

- Electricity. At sites where electricity consumption is high, it is well worth studying different tariffs. Before entering into a contract with a supplier, consult the Site Engineer, who will be able to identify the best tariff, the various options with regard to the contract, contracted capacity, meters, etc.

- Mechanical Workshops. In addition to the site workshop, it is almost always necessary to use the services of local mechanics. Choose them carefully, and always remember that, here again, the cheapest option is not always the most cost-effective one. You need to find the service that offers the best assurance of quality and speed. It is advisable to negotiate the budget or fee beforehand!

9

OVERSIGHT OF SERVICES

Services should be overseen under the same principles and with the same care as when dealing with materials. Every service note should be checked and signed so as to ensure that the related invoices are easy to verify: they should merely consist of a list of the service notes that are accepted and signed. In the case of services engaged by head office, such as workshop staff or outside companies engaged for assembly or repair work, time sheets should be completed for hours worked, and a record should be kept of the materials that are supplied. Signing off on those documents will avoid disputes over the related invoices.

Similarly, in the case of services rendered to the company on third-party premises, such as workshops, hotels or boarding houses, etc., the same principle always applies: check and sign the receipt.

Wastage originating from poor oversight of services is extremely common, and frequently leads to the payment of inflated invoices.

III.

WASTAGE^{IN} PLANT



10

SURPLUS PLANT

In many of the company's projects, the use of equipment—whether company-owned or hired from third parties—represents a large component of the costs. This will tend to happen increasingly since modern technology is expanding the applications where automation is advantageous. However, machinery is very costly and any wastage in this area will inevitably have serious repercussions. Always remember that the cost of work performed by a machine is composed of the following factors:

- Operator salaries and benefits
- Interest on capital invested in the plant
- Fixed depreciation, which is independent of whether the machinery is used or not; even when it is not being used, it ages and deteriorates due to the simple passage of time.
- Depreciation per hour of work.
- Maintenance, repairs, spare parts.
- Consumption of fuel, energy, lubricant, etc.

If a machine is idle due to lack of work, there will be no costs under the latter three headings. However, the first three are unavoidable and will represent a pure loss since the machinery will be costing money while not producing any work.

As a result, the first wastage to avoid is a surplus of machinery. Except for special circumstances (which must be justified), machinery should be operated for a high percentage of available hours. Otherwise, it is expensive; too expensive.

11

PLANT PERFORMANCE



When plant is being operated, every hour of work represents a fixed cost which is the sum of the items listed in the preceding section. However, the machine may perform a variety of tasks in an hour, and the true cost is not the gross cost per hour but the cost per unit of output.

The greater the number of units produced, the lower the cost. For example, let us suppose that an excavator costs 400 pesetas per hour. If it moves forty cubic metres of earth in that time, then each cubic metre would cost 10 pesetas. However, if the excavator moves only 20 cubic metres, each cubic metre would cost 16 pesetas, i.e., 6 pesetas more. At the end of the day's work, that represents a difference of approximately 1,200 pesetas. Over a year, the difference will amount to 360,000 pesetas. A shocking waste!

Always have the machine ready, keep an eye on its performance and study carefully its instruction manual.

12

PLANT UPKEEP



Plant that is not well looked after: a) will perform poorly, b) will break down regularly – meaning frequent halts of production, c) will need lengthy and costly repairs (much more costly than a sound maintenance programme).

Plant rarely operates in isolation on site, independent from the rest of the project. Sometimes, as in the case of quarries, a breakdown in any item of plant is enough to halt the entire facility, since any breakdown in a production line has serious repercussions. When this happens, it leads to very costly losses and wastage.

Therefore, always follow plant upkeep instructions with the greatest rigour. Stay up to date with the maintenance schedule (greasing, replacement of wearing parts—before they break) and check the maintenance schedule, which should be displayed prominently, on a daily basis.

In this, as in so many other things, order and smart planning can work miracles. Prevention is better than cure!

13

PLANT SPARES

Site stores should always have a stock of spares for parts that regularly need to be replaced (including consumables) as well as the parts that it is considered advisable to have on hand in case of emergency, on the basis of a technical study. For the same reasons as mentioned in the previous section, stocks of spares should be reviewed frequently and the necessary replacements should be ordered in time.

Parts that are replaced may often be re-used once they have been refurbished. This should be done without delay. Do not keep useless or broken parts! Fix them if possible. Otherwise, dispose of them as scrap.

14

HIRED PLANT

Projects frequently hire plant from third parties, very often from the Ministry of Public Works. In this case, wastage can take a number of forms:

a) Underuse. Plant hire contracts normally stipulate a minimum number of hours per month, which must be paid for whether or not the plant is used. If the plant is used for half the minimum number of hours, then the cost per hour is DOUBLE what was budgeted for! If a machine is not needed or is being underused, send it back! If you would like to keep it for a future purpose, negotiate special conditions with the supplier so that the cost of idle hours can be reduced. This is quite often possible in practice.

b) Poor planning. Do not arrange for the plant to arrive on site before it is actually needed, otherwise it will sit idle. When the machine is no longer needed, give the plant hire firm sufficient advance notice to come and collect it. This will ensure that the machine does not remain idle on site for days after its work has actually finished, waiting for someone to come and collect it. Both are cases of absolute waste.

c) Negligent management. Wastage occurs in this instance through failure to oversee the hours actually worked or lost due to breakdown (the latter must be deducted from the plant hire invoice), and through failure to check the receipts that serve as the basis for invoicing. Similarly, failure to oversee spares and replacements provided by our own site workshop, which are to be invoiced to the plant hire firm or the Ministry, and failure to document them.

Hiring plant always represents a substantial portion of project costs. Wastage can amount to thousands of pesetas, so ensure it is given due attention.

IV.

**WASTAGEZ
LABOUR**

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GENERAL CONSIDERATIONS

“Time is money”. Have you ever stopped to think what this common phrase truly means? On site this meaning is extremely obvious: time is measured in thousands of pesetas that build up inexorably on the cost side.

It is quite common to read newspaper reports of the type: “Each hour of filming this movie costs 125,000 pesetas. Movie star B.B. turning up on set two hours late cost the production company 250,000 pesetas”... The same thing happens on a construction site. Each hour of “shooting” on site is worth a sizeable amount. Any time spent poorly or work performed ineffectively represents wastage that can rapidly multiply into a considerable amount. Things have to be done “with the least possible work”. This is not a recommendation to swing the lead; rather, it is a fundamental principle of economics. Examples:

- Is what Worker A is doing necessary and useful? What is its purpose? Could he be using a better method?
- There are 10 labourers on a given site: could the same work be done by just 8 or 9?

Another very important principle is **subsidiarity**; applied to this case, it would be expressed as follows: “Do not do work that could be done by one of your subordinates”. This kind of wastage has two facets: a) whilst you are doing your subordinate’s work, you are not doing your own, which is more important than the work of your staff; and b) your subordinates will neglect their own work and will lose their sense of responsibility, growing accustomed to the idea that someone else will do their work for them.



To avoid wastage of work, you will need to start at the top. Keep the project or department organisation chart up-to-date and clear. Everyone should know their functions, obligations and responsibilities.

17 FAILURE OF AUTHORITY

This invisible form of wastage is one of the most damaging. Its repercussions reach deep into all aspects of project operation, and reduce productivity. The effect on finances is always considerable. Listed below are the most common forms:

- Authoritarianism. Giving strict orders, overruling objections and threatening punishment, etc. can undermine a manager's authority with the result that discipline becomes lax.
- Demagoguery or weakness. Subordinates are allowed to disobey orders without any consequence.
- Favouritism. A biased boss will not have the employee's obedience or respect.
- Public reprimands. This is a serious mistake. It destroys any possibility of achieving positive results and weakens authority.
- Counter-orders. It is sometimes necessary to countermand an order. However, this practice should be minimised. Remember the age-old adage: order + counter-order = disorder.

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PROJECT PLANING



The company's object is to execute projects and provide services. Upon completion of our work, we will have upgraded so many kilometres of road, produced so many cubic metres of ballast, or so many tonnes of concrete.

We are paid for this, and that payment is what sustains all of us who work for the company. The work needs to be done, but how we do it is of vital importance. A simple breakdown of activities will demonstrate a few of the essential points:

- Clearly define the job. What has to be done, where, and in how much time? However elementary this may seem, it is sometimes very difficult to discover. Before starting, analyse the proposed task and ask for all the details and clarifications that may be needed.
- How work will be completed. This phase is of the utmost importance. What method or system will be used? What kind of plant and other resources will be required? When and where? What kind of staff will be required; when, and where? Scheduling the project phases over time. Anticipating incidents and difficulties: what solutions will be available should they be needed?

Any time spent on this phase will be amply recouped in subsequent stages.

- Prepare resources and staff. Once the foregoing decisions have been made, it is necessary to prepare the required plant and other resources, the necessary materials, and the staff of all types to carry out the project. A lot of wastage occurs on site due to stops and starts caused by missing materials or personnel.

- Execution. This must be done in accordance with the plan. If this is not possible, then the plan was poorly conceived. If the project actually needs more material resources and more staff than initially planned, that is very serious since it increases the costs and may lead to a loss instead of a profit.

- Assessment of completed work. Was the plan fulfilled in terms of quality, amounts and timescale? Any major deviation means waste, or a lack of foresight, which is perhaps the worst form of wastage.

It is not always possible to prepare so thoroughly. Sometimes there just isn't time. However, that's "sometimes", not "always". Improvised or badly planned projects always cost more. Keep them to a minimum! Everything that has been mentioned above can be applied to all kinds of work, including administration and paperwork, which also costs large sums of money. Before making any decision:

- Learn everything about the matter. Request the necessary background details.
- If you are dealing with an important or complex issue, draw up a little guide or schedule listing the main points.
- Collect all the documents and information that are needed to study and decide upon the case.

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WASTAGE IN STAFFING

"The more the merrier". We could counter that with another popular saying: "Two is company, three is a crowd". Both are true, within limits. Yet, ... are we always beyond these limits? Consider the question, and answer it for yourself on the basis of actual cases that you know well.

There is always an instinctive tendency to overstaff—to employ more people than you actually need. Of course, this is something that needs to be evaluated by each individual manager, who must decide what a project actually needs. Some standard causes of wastage are listed below:

- Staff with no defined function. They are there "to help out", but merely potter around without any clear purpose. Such a time waster!

- Staff with connections. Employees that are not absolutely necessary but were taken on because someone recommended them or because they are related to someone working on the project.

- "Lingering" staff. Employees who are now surplus to requirements but have been kept on to do "maintenance". It may take a long time to dismiss them.



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OVERTIME

As the name suggests, these are not normal working hours and should be viewed as an exception. Rein them in! Sometimes there is more overtime than normal working hours! Though overtime may be arguably necessary in specific cases (staff shortage, peak workloads, etc.), it is twice as costly because:

- it incurs a surcharge of up to 40%

- staff are much less productive during overtime than during normal working hours.

Once the reason for introducing overtime has disappeared, are normal working hours resumed?

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TRAVEL ERRANDS

"Go to town and bring back a ...", "Put this on the lorry and take it to ...". Occasionally, one hears the same or a similar order being given an hour later. It's not that the first order was not obeyed—it's that generally something

similar comes up just after the person or truck has left the site, requiring another trip (an “urgent” one, this time).

Economise on trips and errands. Schedule them as much as possible and make sure everyone is aware of the timetable. For example, Mondays, Wednesdays and Fridays is when errands are run in the city, or a lorry leaves for such and such a place at 17:00. Everyone can then prepare their messages or deliveries in time, and “extra” journeys will be confined to cases that are truly urgent or unforeseen. Consequently, their number will be greatly reduced.

Numerous trips and errands in the site itself can be avoided in the same way. All it takes is a little bit of order and organisation. For example: take items directly from the store to where they are needed, without passing through way stations or buffer stores. And use the proper resources: an item that may be difficult to carry between two people may be transported easily by one worker ... with a cart.

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WASTAGE IN THINKING

This issue is particularly applicable to management. It is more important since wastage in “leadership or thinking” has repercussions on all lower echelons, where it is multiplied. The following brief points define “wastage in thinking”. A bit of thought should produce the most practical approach for addressing this issue.

ORDERLY THINKING Go from the simple to the complex. First, analyse the various components of the problem. Do not decide anything until you know all the details.

OUTLINE A PLAN Before carrying out any task, consider the best approach. Prepare the details and documents that will be required. Get to the heart of the matter and do not allow yourself to be distracted by minor details. If the work is important, or will last several days, write a plan. If a given method achieves results, use it in the future for similar projects and do not modify it or change it without a good reason.

FINISH WHAT YOU BEGIN Once a job has been started, do not stop until it has been properly completed. Jobs which are begun and abandoned before completion cost twice as much in time, effort and money.

AID YOUR MEMORY Make a note of important information and file it appropriately so that you can find it when you need it, without wasting any time.

ORDERLY FILING Learn and apply the company's filing system: a good command of the system will greatly help your work. Keep all filing, papers and notes up to date. When a document is not being used, file it so that you, or a colleague, can retrieve it when you need it. Do not use a "personalised" filing system: You may understand it but no-one else will. The system should be the same across the board: the company system.

SYSTEMATISE INFORMATION Applying the preceding two recommendations makes it possible to return to any issue at a later date without having to wrack one's brain. Failure to apply them puts us in a difficult situation, with no record of what happened.

BREVITY IS THE SOUL OF WIT There is no need to be excessively verbose and detailed. Do not present background information if the person involved is already aware of it. Get to the point, be concise, and avoid repetition. You will be surprised by the amount of time that can be saved in this way, and by the resulting clarity.

ONE THING AT A TIME Deal with matters one at a time. Move on to another matter only when the current one has been dealt with. A short break, or a moment of small talk, will clear your mind and avoid confusion.

BE A GOOD LISTENER Listen to the other person, instead of thinking about what you are going to say next. If you ask a member of staff for a report, let them speak, and don't interrupt them with distractions or minor issues.

We all like to be heard, but a boss who does not know how to listen will lose the staff's respect.

BE ACCURATE Orders must be accurate, complete, clear, and brief (by this we do not mean "brusque"). Take a comprehensive view of the issue; no further clarification should be necessary.

SHARE YOUR KNOWLEDGE When you notice something or achieve good results as a result of investigation or new methods, inform others so that they may also benefit from this experience.

Pooling knowledge makes work easier for all.

V.

**STAFF
COOPERATION**

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MANAGERS AND SUPERVISORS

This is the key to a business—not only as regards fighting wastage, but all activities. If managers and supervisors don't set an example and fight wastage in their own work and that of their subordinates, lower echelons are very unlikely to do anything about it. This bears thinking about: we are all responsible, in the scope of our own work.

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SUBORDINATES

In order to achieve subordinates' full cooperation in this matter, it is necessary to a) teach them what wastage is and the damage it causes, b) explain what should be done in each case to avoid it, c) convince them that this is important, that their collaboration is vital, that it is not a criticism but a call to work better for everyone's benefit.

In short: achieve open, determined cooperation. Here, more than in any other area, little will be achieved by giving orders, sending memos or reprimanding. The best approach is to inform staff about the various forms of wastage in general, and then gradually grab their attention with actual cases, first in other people's work, and finally in their own.

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STAFF SUGGESTIONS



This may well be the best system for getting staff to cooperate on known cases of wastage, without relying on the ideas that may arise.

In fact, just asking staff for their thoughts and opinions makes them aware of their importance and that they are appreciated.

In practice, quite a few of the ideas will be useful, for a number of reasons: whereas a manager may see an issue for five minutes, a staff member sees it for eight or ten hours per day. It goes without saying that they will see things that the manager will not. As managers have many members of staff, generally speaking, if an idea does not occur to one member of staff, it may occur to another. It would be unsurprising if someone came up with a smart solution. And this solution can be replicated throughout the project, and perhaps throughout the company, providing very significant savings through the accumulation of small economies.

It is important to motivate staff to make suggestions and comments. Listen to them all, do not rule any idea out, and when someone produces a viable idea, reward them with a bonus, a promotion, etc., and publish the news on the site notice board.

To avoid demoralisation:

- Do not wait for people to come up with suggestions. Visit staff regularly at their places of work and ask them if they have thought of anything. Ask them to consider the matter, and inform them that you will return in a few days' time.
- Help the less vocal members of your staff. Convince them that no-one will laugh at them, that all suggestions will be welcomed, whether or not they are viable. The most important thing is the employees' willingness to participate.
- Give a formal promise (and keep it) that if a suggestion enables something that was being done badly to be corrected, the person responsible for the mistake or carelessness will not be punished. This will ensure that

people do not keep silent about potential improvements out of loyalty to co-workers. The person who makes the suggestion should never be worried about being branded a “snitch”.

- Involve line managers. Staff will be unwilling to make suggestions if they think that their line manager will be displeased, or that they will be perceived as an impertinent fault-finder. Ensure any bonus or reward is conveyed by the line manager.

- Give a promise (and keep it) that nobody will be dismissed as a consequence of any saving achieved by their suggestions. If the issue does arise, restructure the organisation chart appropriately.

- Instil in all staff the idea that the suggestions should never stop coming. The mere fact that a department has acted on one suggestion does not mean that there are no further improvements to be made.

- If staff are finding it difficult to express themselves, help them as necessary. What matters is the core idea, not the way it is expressed.

- It will be sufficient for a suggestion to identify a problem; it does not necessarily have to provide a solution. If solutions are also provided, then that is a plus. However, the simple act of pointing out that something is not going very well and needs a solution is enough in itself. It is, after all, the necessary first step for solving a problem.

The following ideas may be of use for gathering suggestions:

- What is the purpose of your job? What elements of your job are unnecessary and could be eliminated?

- How does your work integrate with that of others? Could any of the processes be simplified or eliminated? Are you duplicating the work of someone else?

- If you had to pay for what you are doing out of your own pocket, could you find a way of doing it faster, or of saving material, or of employing someone at a lower cost?

- There is no such thing as a small saving. Improving your specific job may save a few pesetas, but if it can be replicated for the company's more than one thousand workers, then it will amount to thousands.

- Know the price of things. For example: how much lubricant costs. If we spend 2,000,000 pesetas per year on oil, a 10% saving would amount to 200,000 pesetas in this area alone.

We have now come to the end of this Manual. We look forward to receiving your suggestions! Please send them to Head Office, reference 621-E, so that we can improve future editions of this publication.

**MANY THANKS
FOR YOUR COOPERATION**

FERROVIAL TODAY

Ferrovial is a world leader in sustainable infrastructure and services.

The company operates in over 15 countries through its services, toll roads, construction and airports divisions, managing some of the world's leading privately-owned transport infrastructures, such as Highway 407 in Toronto and London Heathrow Airport.

Ferrovial is part of Spain's blue-chip IBEX-35 index and also of the prestigious DJSI and FTSE4Good sustainability indices.

Some of Ferrovial's key figures*:

70,000
EMPLOYEES
in over 15 countries

7.446 **16%** of which is
BILLION generated
outside Spain
euro in revenues,

818
MILLION
euro in EBITDA

48% coming from
outside Spain

22.422
BILLION
euro of backlog

6.840
BILLION
euro in market capitalisation

SERVICES



827

CITIES

in 3 countries

48

MILLION

square metres of
parkland maintained

19,500

KM OF HIGHWAYS

and roads maintained
or managed

TOLL ROADS

2,000
KILOMETERS

in concessions

in 6 countries



20.3

BILLION

euro in managed
investment

CONSTRUCTION



18,850

KM OF ROADS

and highways

35

AIRPORTS

4,000

KILOMETERS

of canals

145

DAMS

4,100

KILOMETERS

of railway lines

135

HOSPITALS



AIRPORTS

109

MILLION

passengers
per year

1.7

MILLION

tons of cargo
carried per year

COMMUNITY INVESTMENT



850

PROJECTS

830,000

FLIGHTS

per year

operated by
204
airlines

612
destinations

1.7

MILLION

beneficiaries

60f
years