Stabilizing work schedules in a call centre: expected and unexpected results

Jordi Olivella[1] and Rafael Pastor[2]

[1,2]Department of Management, [2]Institute of Industrial and Control Engineering (IOC)
Universitat Politècnica de Catalunya; Diagonal 647, 08028 Barcelona, Spain.
Corresponding author: Rafael Pastor; Tel. + 34 93 401 17 01; Fax. + 34 93 401 66 05;
E-mail address: rafael.pastor@upc.edu

Abstract

At call centres, work schedules change frequently and are often announced at the last minute, which causes absenteeism and turnover. We analyzed the call centre of a major Spanish electricity company. This centre requires a long initial training period and therefore turnover is especially damaging. New scheduling methods were adopted that limited the variability of individual timetables. Lower turnover and absenteeism were expected to compensate for the disadvantages of limitations to changes in timetables. We developed a software tool to assign timetables. An interval of time was assigned to each worker. The software calculated the coverage demand associated with these assignments. Next, the software establishes work on weekends and public holidays, weekday days off and, finally, individual timetables. This process is fully automatic, but every detail is displayed. Middle managers approved of the new policy and the tool. Nonetheless, turnover decreased less than expected and absenteeism, rather than decreasing, increased.

Introduction

Call centres are as diverse as the needs of the industries that use them. Tasks can be classified into three categories: transactions, sales and technical support. In transactions, speed is the main goal, whereas in sales and technical support success is more important. Some call centres are the main or only connection between a company and its customers. In these cases, the call centre is a strategic part of the company.

Nevertheless, the human-resources practices of call centres are usually based on low-skilled workers, low wages and schedules arranged without considering the needs of the employees. Some labour policies make no attempt to fight burnout (Catriona et al., 2000). A high rotation level, caused by the company itself, is used to prevent the effects of burnout. This policy is clearly disadvantageous when the service provided requires prolonged training.

Scheduling is an important and conflictive issue at call centres. Call volume changes from one hour to the next throughout the day, from one day to the next throughout the week and from one season to another. In order to cover the needs and minimize cases of capacity being exceeded, each employee's work hours must be arranged carefully. This results in variable work hours that are often changed at the last minute. Furthermore, senior employees are usually given priority in choosing tasks, work hours and holiday days, whereas recently hired employees take on undesirable tasks and schedules. Unfavourable working conditions cause high turnover and absenteeism (Grebner et al., 2003).

The alternative is a formal, clear procedure for arranging schedules that is agreed upon with workers. The procedure should contain strict limits on changes in work schedules and on notice period for changes. Under these conditions, a sharp drop in turnover and absenteeism was to be expected. This drop can be reasonably expected to compensate for the decrease in flexibility caused by these restrictions, especially if initial training is expensive. Moreover, an adequate scheduling tool can also reduce the effects of the new restrictions. However, in the case presented in this study, the results were only partially satisfactory.

Initial situation and goals

We analysed a call centre of a major Spanish electricity company. It is an inbound centre – that is, calls are received. The call centre is responsible for all kinds of communication between the electricity company and its clients, including queries, applications, service problems, doubts or problems with bills, and so on. The initial training period is long (about three months).

The centre was facing difficulties. There were many categories of workers, essentially based on seniority. The more-experienced workers could choose their work hours and annual leaves and never had to work on public holidays or weekends. The rest of the staff had to adapt their schedules to cover the needs. They had to change their timetables very often. This had several negative results: inexperienced workers covered public holidays and the most common periods of annual leave, while the rest of the time was covered by workers with more seniority and training but little motivation. Turnover was very high among new workers because of their unsatisfactory working conditions and absenteeism was high.

In order to cover the service load, the centre operated with a group that largely exceeded the minimum necessary workforce. The possibility of a work plan comfortable to workers was not considered. A new management team then took charge of the centre. They promoted an alternative strategy based on applying the same conditions to the entire group, stabilizing timetables and hiring full-time employees. Among other effects, turnover was expected to drop as a result of this policy. Absenteeism was also expected to decrease. The management knew that it was important to avoid capacity being exceeded. The new work schedule also had to address this problem.

This objective seemed attainable. The centre had to have a certain number of telephone agents available at all times. The goal was to provide the service with the employees necessary in a large number of cases. The number of workers available is the result of staff size, assignments, absenteeism and the number of trainees. Under a less-flexible

assignment scheme, more people are needed, but lower turnover and absenteeism could make up for this effect. The experience of the call centre shows a strong negative relationship between stability in work hours and turnover and the literature also reflects this relationship (Brooks and Swailes, 2002; Dalton and Mesch, 1990).

This effect was tested by simulation. Table 1 shows a situation similar to reality called "Scenario 1". In this case, 124 workers out of 150 are expected to be present with a probability of 98%. If the goal is for 150 workers to go to work 98% of the time, 181 workers have to be hired. But the work load will only be covered all day with a probability of 98% if individual work hours can be changed when necessary. Otherwise, more people are needed. Now let's assume that the workers are divided into six groups. The workers in each group have similar work hours and can replace one another. However, in order to limit the variability of work hours, changes between groups are not allowed. In this case, conditions have to be fulfilled in every group. With the same parameters (Scenario 2), one can only rely on 19 out of 25 workers with 98% reliability. This means that, in order to rely on 25 workers, 33 people are needed, for a total of 198 (6 groups of 33 people). However, the results will be different if turnover falls sharply and absenteeism decreases. Scenario 3 shows that 20 out of 25 workers are expected per group. Therefore, 31 are needed to cover 25 posts, for a total of 186 (6 groups of 31 people). The number of workers needed is similar to that of the initial situation, but with dramatic advantages: the total number of hours worked is higher (absenteeism drops, the number of trainees decreases and, to maintain the probability of coverage, staff size remains unchanged) and working conditions are better because of the limitation on individual changes to work hours.

Insert table 1 here

This calculus does not accurately reflect the real situation. In fact, the number of combinations of possible timetables is almost infinite. However, we considered it accurate enough to be confident about the possibilities of the policy of stable work

schedules. Specifically, the solution adopted was the following. A time interval was assigned to each worker that was one hour longer than the number of hours he or she had to work. The employee's work time had to be included in this interval, either working without a break or with an hour-long break. Work time could not change during a given week and at least one month's prior warning had to be given of any changes. Workers were needed on weekends and holidays. This was compensated by free time in the same week. This scheme, which combines individual changes, allowed a notable level of flexibility. However, suitable tools for planning timetables had to be developed.

Planning tools developed

Schedules used to be prepared manually. This was hard work that often yielded very inefficient solutions. Only by using suitable software could the new conditions be implemented. The following two tools were developed:

1. Tool for determining the staff volume required

The forecasted call volume and distribution throughout the day change very often, as is common for call centres. The staff volume is therefore obtained using a standard (very typical) day. The tool takes a set of work times and the workload for the standard day. With these data, it obtains the combination of work times that allows the workload to be covered with the smallest possible total number of employees. As described in the literature, this problem is solved with mixed linear programming (Ernst et al., 2004). Here it was solved by rounding off the solution of a linear problem. This procedure is inexact but the solutions are acceptable and the software is cheaper if mixed linear problem solvers are not used. By gathering the work times with no more than a one-hour difference, the time intervals to be assigned can be established.

2. Tool for assigning work times

Planning work times in a way that respects all of the conditions can be a difficult problem. The process has to be clear to the employees managing the centre, to the people in charge of planning and to all workers. A visual tool makes this possible. Figure 1 shows the first screen of the software (circles with letters have been added here). The initial information is as follows:

(A) List of workers. The abbreviation “VA” means that the worker is on holiday. Workers available to work on weekends (with the exception of recent maternity cases) are marked in the column “Di”. The last two columns show how many weeks the employee has gone without working on weekends and public holidays respectively.

(B) Interval assigned to each worker. The company commits itself to assigning each employee work hours in a certain interval. To simplify the process, workers with the same interval are included in a group.

(C) Possible work times considered for each group, taking into account the length, the interval that changes are limited to and any other conditions.

(D, right) The week being planned.

(D, left) Public holidays during this week, when applicable.

(E) Work hours included in each possible timetable.

(F) Need for workers for every half-hour period of every day of the week (except Friday, which is considered equivalent to Monday). Presence on weekends and public holidays is known and fixed for all weeks.

Insert figure 1 here

The first step in solving the problem is to obtain a solution by taking as a variable the number of workers with the same assigned work time. This initially means that the solutions will be something like “N people assigned to timetable A have to work this week during possible work time 02”, and so on. An employee’s work time must not change during the week. Day-to-day planning must be carried out at the same time,

because days off earned by working on weekends and public holidays must be assigned. To fulfil both conditions, Monday and Friday are scheduled equally, without days off (records show that they are the busiest days). Therefore, an equal or smaller amount or work is assigned for the rest of the days, due to free days that compensate for work on weekends.

This problem is also solved with a linear program. The objective function again maximizes the minimum coverage of the workload in terms of percentage. Figure 2 shows the result in a certain case: a certain number of workers is assigned for each group, possible timetable and day (for example, 20 out of the 25 workers in group A have to follow timetable 01 on Monday, 20 on Tuesday, 19 on Wednesday, etc.).

Insert figure 2 here

Finally, individual assignments are made. This process includes:

- Assigning work on holidays, when necessary, based on the number of weeks since the last time the employee worked on a public holiday.
- Assigning work on weekends, based on the number of weeks since the last time the employee worked on a weekend.
- Assigning work times for the week. Forecasted work times are assigned to the workers in each group, in a correlative process that begins by selecting a worker randomly. Initially, only work times that follow the previous week's schedule are assigned. In a second round, changes are applied (always respecting the possible work times of each group).

Figure 3 shows how the result is displayed. Each worker has a work time assigned from among the possible work times of his or her group. In some cases, weekend work and a compensatory day off are assigned (for example, "Agente 102" follows timetable 12,

works on the weekend and has Tuesday off). The data remain available in the future so that the time since the last weekend or public holiday worked can be determined.

Insert figure 3 here

Results and conclusions

From an operational point of view, the new method for work time assignment was implemented without remarkable incident. The new rules were well accepted by the workers and direct supervisors. Table 2 shows the results of a questionnaire answered by the 13 supervisors. The results are clearly positive, even though these supervisors have high seniority and did not participate in the design of the changes.

Insert table 2 here

Nevertheless, the intervention was ultimately far from successful. Changes in workers' behaviour took place, but not with the intensity (or even the direction) that was expected. Table 3 shows data from the seven quarters before the intervention (1 to 7) and the following five (8 to 11). Turnover decreased, but the improvement was very far from what was expected. However, the main disappointment was absenteeism, which in fact increased sharply.

Insert table 3 here

These results generated mixed feelings. Work was done satisfactorily and at remarkably low cost. In fact, the failure may have been caused by the workers rather than the planning tools. However, according some sources, a certain disorder is necessary to maintain tension. If this is true, the tools were certainly to blame.

Collective agreements have made work time stability obligatory at Spanish call centres. These tools have been used repeatedly while absenteeism has increased – it seems – again and again.

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Jordi Olivella is an associate professor of the Castelldefels School of Technology of the Technical University of Catalonia (UPC). He has seven years of professional experience as a life-insurance actuary. He holds a PhD in business administration. His research focuses on work organization, especially work time schedules, task assignment and work teams.

Rafael Pastor is an associate professor of industrial engineering and operations research at the School of Industrial Engineering of Barcelona of the Technical University of Catalonia (UPC). Previously, he worked as a product production manager for Revlon. Dr. Pastor holds a PhD in industrial engineering and a Master's Degree in Logistics Organization. His research focuses on the use of a variety of combinatorial optimization techniques to model and solve real-world applications in production, scheduling and manpower planning. He has published in TOP, EJOR, JORS, IJPE, Annals of Operations Research, Ricerca Operativa and IJSTM.

	Scenario 1		Scenario 2		Scenario 3	
Staff	150		25		25	
Turnover	20%		20%		4%	
Training days	60		60		60	
Maternity	6%		6%		6%	
Maternity days	112		112		112	
Became sick	1.5%		1.5%		1.25%	
Remained sick	75%		75%		75%	
Other absences	2%		2%		1%	
N / Probability of attendance equal to or greater than N	123	99%	18	99%	19	99%
	124	98%	19	98%	20	98%
	125	96%	20	96%	21	96%

Table 1. Expected effects of the change in presence parameters.

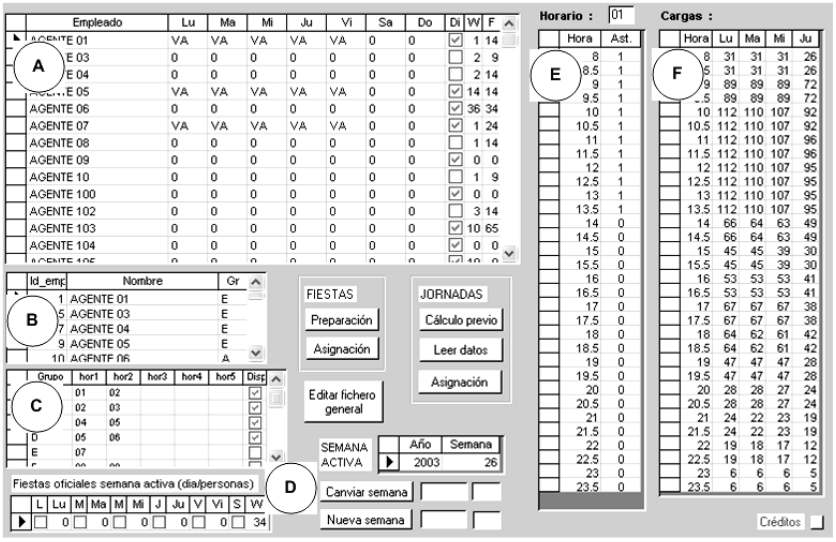

Figure 1. Screen 1.

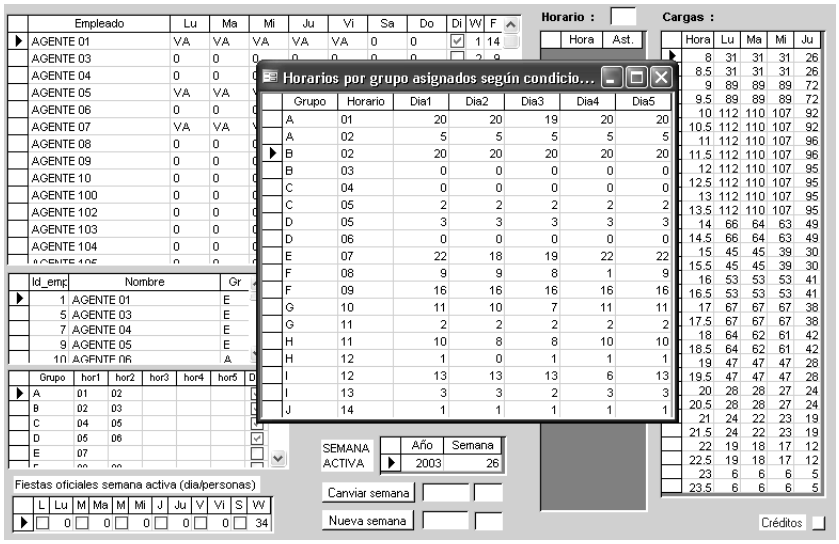

Figure 2. Screen 2.

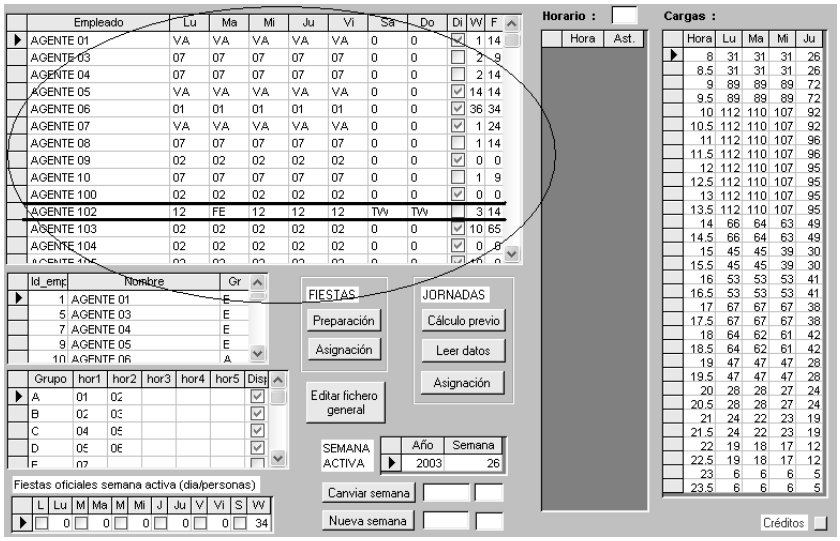

Figure 3. Screen 3.

Questions	Answer (scale of 1 to 10)					
	5	**6**	**7**	**8**	**9**	**10**
1. The new method improved the general working atmosphere.	0	6	6	1	0	0
2. The new method minimizes the impact of work time changes on workers.	1	3	5	4	0	0
3. The new method helps maintain the level of quality.	1	2	8	2	0	0

Table 2. Opinions obtained from the 13 supervisors.

Quarter	Absences (days)	Staff (average)	Absences (person/year)	Absence (percent)	Turnover (percent)
1	305	141.42	8.63	2.36%	19.80%
2	252	149.73	6.73	1.84%	16.03%
3	633	163.36	15.50	4.25%	7.35%
4	291	178.62	6.52	1.79%	15.68%
5	497	178.80	11.12	3.05%	17.90%
6	638	165.60	15.41	4.22%	7.25%
7	925	150.15	24.64	6.75%	13.32%
1-7 average	505.86	161.10	12.56	3.44%	13.90%
8	727	160.02	18.17	4.98%	17.50%
9	1103	171.94	25.66	7.03%	2.33%
10	550	187.58	11.73	3.21%	6.40%
11	793	184.67	17.18	4.71%	8.66%
8-11 average	793.25	176.06	18.02	4.94%	8.72%

Table 3. Data obtained before and after the intervention.