

STATISTICS AND PROCESS CONTROL IN ITALY

Roberto Mallia

Italian Association for Quality (A.I.C.Q.).

SUMMARY

SPC (Statistical Process Control) was introduced in Italy after the Second World War because of the pressure of military contracts and the requests of importing countries. To keep up with Ford, FIAT and several other companies began using SPC, although up today statistics at a high level is chiefly used within large chemical and steel companies. This is due to the fact that managers seem more interested in getting a certification of high quality, necessary for exports, rather than in the product quality itself and also to the fact that only recently statistics has been included in the curricula of the Engineering Faculties.

The attendance to the courses in statistics offered by the "Associazione Italia-Centronord per la Qualità" during some decades is then considered. The conclusion is that the interest in the managerial and organizational aspects of quality control has grown to the detriment of the interest in the application of statistical methods.

The situation which was so clearly described by Professor Greenfield is not far different from that in Italy. SQC was introduced in Italy after World War Two; at first it was adopted by US-owned industries and later also by local industries. In 1962 the Italian Standards Institute issued the first of a series of standards on sampling plans by attributes (drawn from the Columbia University plans and later from MIL STD 105D) and by variables, on control charts (by variables and by attributes) and on the tests of significance (Student's t , Snedecor's F and χ^2).

The use of acceptance sampling plans became quite popular under the pressure of Military contracts and of foreign import and export requirements.

Not that industry knew much about what it was all about, but it was widely accepted because of the simplicity of its application. The diffusion of control charts was much slower: sometimes the newcomers that started them found out to their dismay that the shop floor was working to tolerances that were quite different from those specified by the drawings and the less that was said about it, the better.

A notable push in the use of SPC in small and medium size industries came through Ford: all its suppliers and its sub-suppliers were gradually involved.

Some time later FIAT adopted a similar policy. Other important industries followed the Ford policy and it may well be said that most Italian manufacturers are now using (and sometimes abusing) SPC.

Higher level statistics is much less popular. Only some big industries, notably process industries in the chemical and steel fields, such as Enimont, ENI and Falck, and Research Centers know anything about it and apply it.

There are several explanations to this general situation:

- a. High level statistics has been taught in Universities only to students of Economics and Statistics and only recently in a few Engineering Faculties, such as those in Milan and Turin.
- b. SPC courses have been given in most Faculties of Engineering in the past five years and very recently also in a few technical schools.
- c. It takes ages before University and School programs are changed; this is due not only to red tape but also because there are not enough educators.
- d. Statistics is widely considered a difficult subject, too much theory, solely for mathematically minded students but not for technical people who require a more practical approach.

When the Italian Association for Quality was founded over 35 years ago its main aim was the diffusion of statistical methods, but with the spreading of the TQM culture, the Association gradually shifted its attention to this new philosophy. Lately the Certification mania switched the interest of industry on the quality of the documentation rather than that of the product (or service) even though the ISO 9000 standards (BS 5751) do mention Statistical techniques.

This statement can be proven by the results of an examination kindly conducted by Dr. Ravasio, of the Department. of Statistics of the Catholic University of the Sacred Heart, Milan, at the Milan Chapter of the Italian Association for Quality (AICQ). The results, attached to these notes, speak for themselves.

Membership has increased steadily: in 1983 it was approximately 500, last year we totalled 1315. In ten years membership has more than doubled; during this same period the number of courses practically doubled every five years. But what is most remarkable is the fact that though in 1983 courses on statistics – introductory and advanced – accounted for three out of a total of seven delivered, they attracted more attendees (59 vs 48) than the other four courses.

In 1988, i.e. five years later, there were twice as many courses on statistics attended by 132 students and just over twice more on other topics but with a

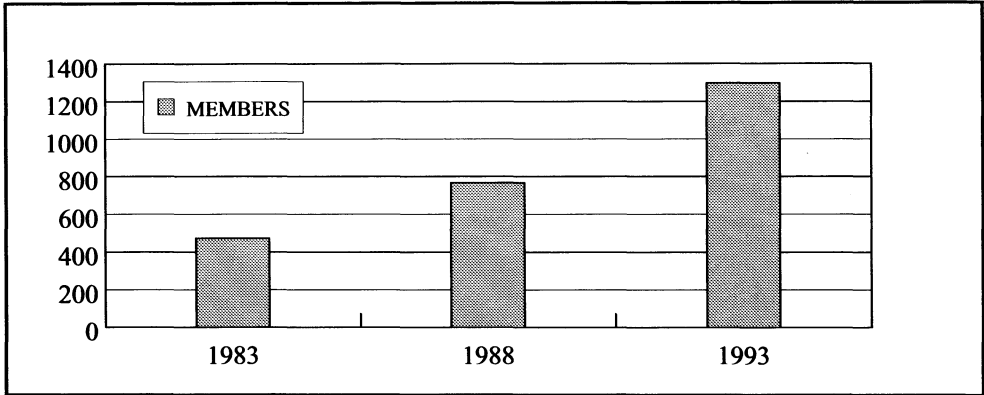


Fig. 1: Membership of AICQ Centronord.

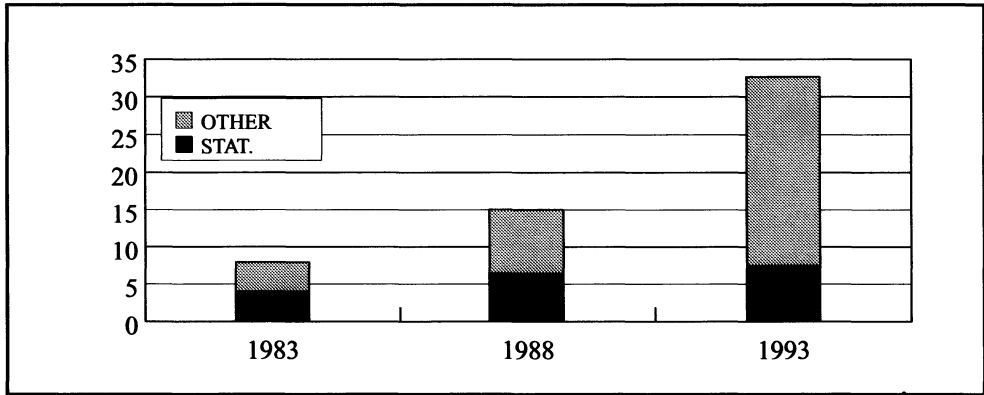


Fig. 2: Number of courses delivered.

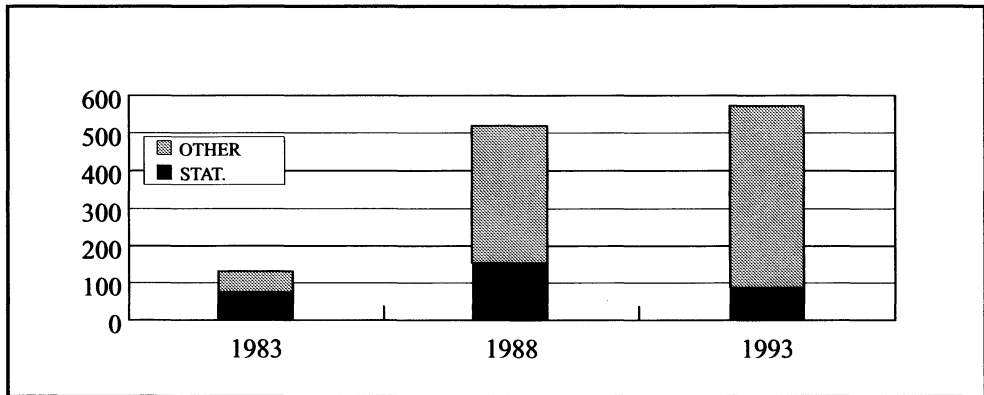


Fig. 3: Number of attendees.

proportionally higher attendance (374). The trend is maintained in 1993 when there were only 87 attendees in the 7 courses dedicated to statistics against an overwhelming to attend the other 26 courses.

It is not up to me to judge whether this is right or wrong. These are simple facts that arise from the examination of admittedly a very small sample drawn from the AICQ Milan Chapter membership (1315) which is over 50% of the national membership.

A look around confirms this situation. Italian industry today is very interested in certification because it is considered a prerequisite for export. Industry wants Quality consultants to get certified, not to improve product or service quality through the use of statistics.

Till the University and High Schools have not turned out a sufficient number of graduates with a minimum knowledge of simple and high level statistics it will be the task of the Italian Association for Quality, hopefully with the cooperation of SIS, the Italian Statistical Society, to devise and implement new education methods to render statistics more palatable to the layman.

Number and Duration of Courses.

Type of course	Number of courses in the year	Average duration of courses in days	Average number of participants	Number of participants	Percentage of participants
Year 1993					
Introductory statistics	2	3.50	17.50	35	6.14
Advanced statistics	3	2.17	8.67	26	4.56
Reliability	2	2.00	13.00	26	4.56
Certification	16	2.25	22.25	356	62.46
Organization	10	1.60	12.70	127	22.28
Sub totals	7 26	2.5 2	12.43 18.58	87 483	–
Totals	33	2.11	17.28	570	100
Year 1988					
Introductory statistics	2	2.00	27.50	55	10.87
Advanced statistics	3	2.33	17.67	53	10.47
Reliability	1	2.00	24.00	24	4.74
Certification	2	1.50	74.00	148	29.25
Organization	7	1.86	32.29	226	44.66
Sub totals	6 9	12.16 1.78	22 41.56	132 374	–
Totals	15	1.93	33.74	506	100
Year 1983					
Introductory statistics	2	3.00	18.50	37	34.58
Advanced statistics	1	2.00	22.00	22	20.56
Reliability	–	–	–	–	–
Certification	–	–	–	–	–
Organization	4	2.00	12.00	48	44.86
Sub totals	3 4	2.66 2	19.67 12	59 48	–
Totals	7	2.29	15.29	107	100

Number of Participants.

Year 1993

Type of industry	Intr. stat.	Advan. stat.	Reliab.	Total	%	Certif.	Organiz.	Total	%
Energy	2	—	—	2	2.78	6	—	6	1.59
Pharmaceutical	—	2	—	2	2.78	8	3	11	2.91
Electronics									
electr. ind.	6	6	6	18	25.00	72	29	101	26.71
University	—	—	—	—	—	1	4	5	1.32
Chemistry	8	3	1	12	16.67	25	11	36	9.52
Building	1	1	—	2	2.78	5	1	6	1.59
Food	2	2	—	4	5.55	14	4	18	4.76
Aerospatial	—	—	—	—	—	—	1	1	0.26
Services	2	—	—	2	2.78	21	11	32	8.46
Data processing	—	1	—	1	1.39	4	—	4	1.06
Textile & clothes	—	—	—	—	—	2	3	5	1.32
Motor vehicles	1	2	1	4	5.55	5	1	6	1.59
Metallurgical	3	1	1	5	3.60	7	1	8	2.12
Machinery & electronics									
electronics	2	2	8	12	16.67	58	26	84	22.22
Other	3	2	3	8	11.11	47	8	55	14.56

Year 1988

Type of industry	Intr. stat.	Advan. stat.	Reliab.	Total	%	Certif.	Organiz.	Total	%
Energy	—	1	—	1	1.20	7	1	8	3.43
Pharmaceutical	2	—	—	2	2.41	—	15	15	6.44
Electronics									
electr. ind.	4	7	4	15	18.07	18	25	43	18.45
University	—	—	—	—	—	—	1	1	0.43
Chemistry	7	5	1	13	15.66	10	15	25	10.73
Building	—	—	—	—	—	—	2	2	0.86
Food	3	4	1	8	9.64	—	5	5	2.14
Aerospatial	—	—	—	—	—	4	1	5	2.14
Services	—	—	1	1	1.20	5	5	10	4.29
Data processing	2	2	2	6	7.23	7	4	11	4.72
Textile & clothes	1	1	—	2	2.41	3	1	4	1.72
Motor vehicles	—	1	—	1	1.20	6	4	10	4.29
Metallurgical	—	—	—	—	—	7	6	13	5.58
Machinery & electronics									
electronics	11	10	3	24	28.91	10	49	59	25.32
Other	5	2	1	8	9.64	11	11	22	9.44

STATISTICA E CONTROLLO DEI PROCESSI PRODUTTIVI IN ITALIA**RIASSUNTO**

In Italia l'SPC (Statistical Process Control) è stato introdotto dopo la seconda guerra mondiale per la pressione dei contratti militari e per le richieste provenienti dai paesi importatori. Per restare al passo con la Ford, la FIAT e numerose altre industrie cominciarono a usare l'SPC, sebbene la statistica ad alti livelli sia tuttora utilizzata solo dalle grandi industrie chimiche e dell'acciaio. Questo sia perché sembra che l'interesse della direzione aziendale sia soprattutto rivolto all'ottenimento di una certificazione di alta qualità, necessaria per le esportazioni, più che alla qualità stessa del prodotto, sia perché la statistica è entrata solo recentemente tra gli insegnamenti delle Facoltà di ingegneria. La situazione attuale riguardo alla frequenza ai corsi di statistica offerti presso l'Associazione Italia-Centronord per la Qualità è stata documentata da una ricerca i cui risultati sono riportati a conclusione dell'articolo. Si può concludere, indicativamente, che è cresciuto l'interesse per gli aspetti manageriali e gestionali del controllo della qualità a scapito di quello per l'applicazione dei metodi statistici.