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CERN - ST Division

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ST DIVISIONAL OPERATION STATISTICS 2000

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Abstract

The ST Divisional Operation Statistics summarise the operation of CERN's technical infrastructure, which is operated by the ST division. In particular the impact of faults on the accelerators and the effectiveness of corrective maintenance are addressed. The statistics are based on the individual statistics of the ST equipment groups and the operation statistics of the PS, SL and ST operation teams.

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1 INTRODUCTION

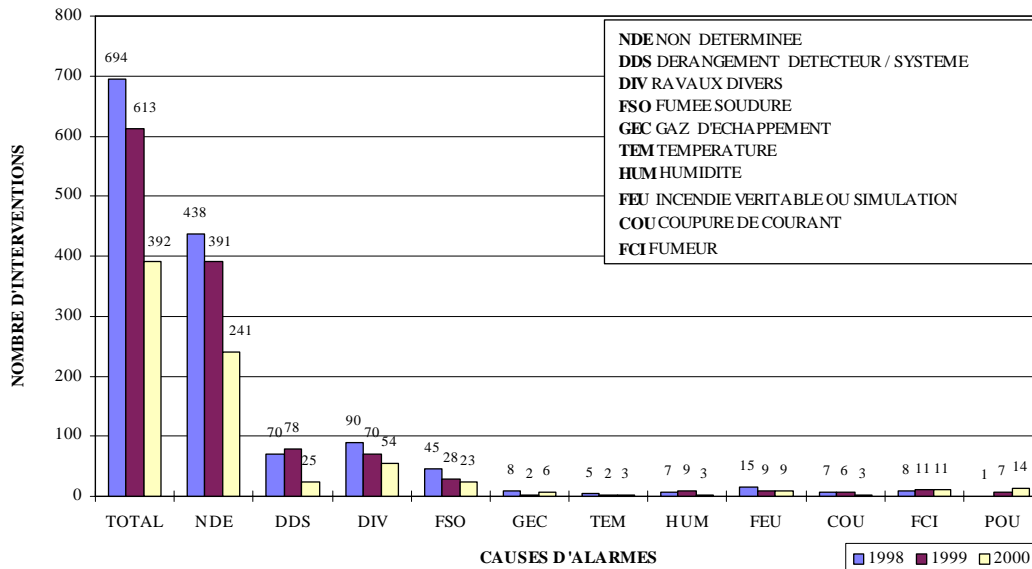
The ST Divisional Operation Statistics summarize the activities of the ST division concerning CERN's technical infrastructure during the year 2000. The statistics are based on the information of the operation teams of the SL and PS divisions, the Technical Control Room (TCR), the computer aided maintenance management system (RAPIER, MP5), the alarm log database and the information of the ST equipment groups. This document presents only a short summary of the more detailed statistics published by the specialists of each sector and is based on the results of the ST Operation Working [1]. The down time and faults of the technical infrastructure that had an influence on the operation of CERN's accelerators and physics experiments are particularly addressed.

A ST Incident Report has been proposed and tested by the operation working group in collaboration with the operation teams of the SL and the PS divisions [2]. This report has proved to be very efficient during the tests and will be correctly put in service for the restart of the accelerators in 2001. With this report improvements of the operation of the technical infrastructure can be planned more carefully and the creation of the statistics will be easier.

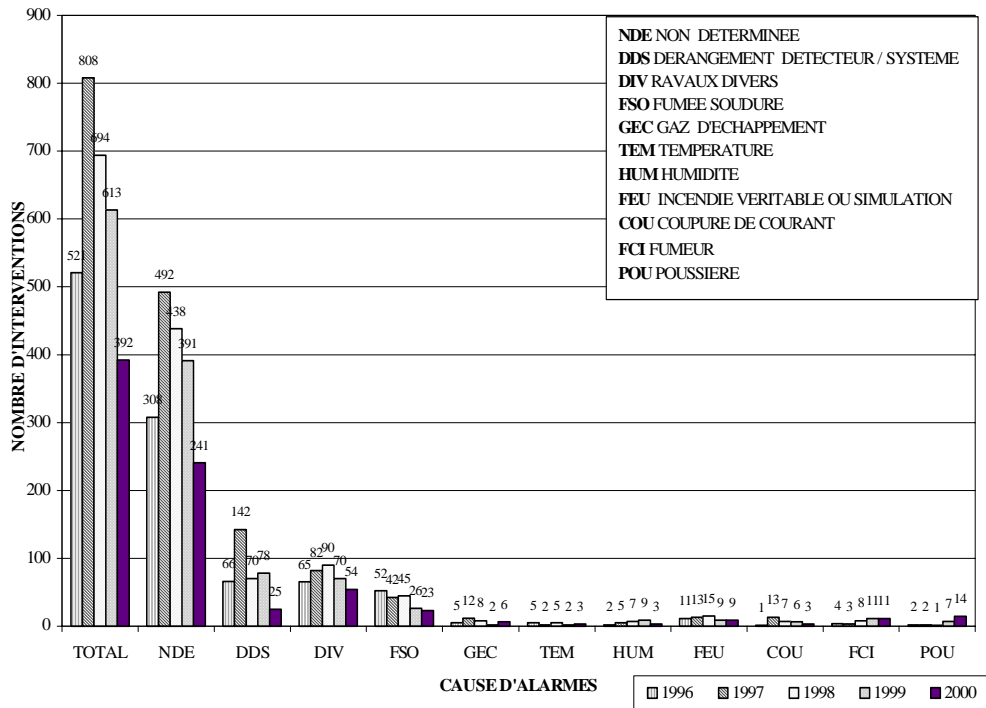
2 TECHNICAL INFRASTRUCTURE OPERATION

2.1 Alarms and Access ST-AA

2.1.1 Alarm causes and fire brigade interventions Meyrin, Preessin, LEP [3]



2.1.2 Total of alarm causes 1996, 1997, 1998, 1999 et 2000 [3]



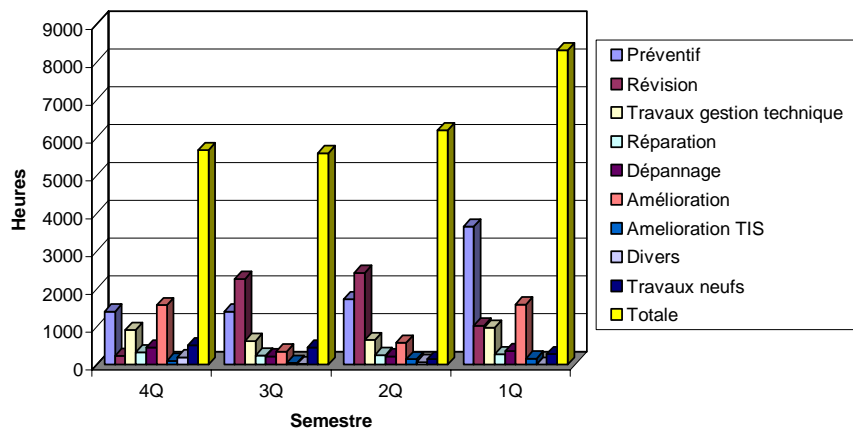
2.1.3 Comments [3]

With respect to last years report:

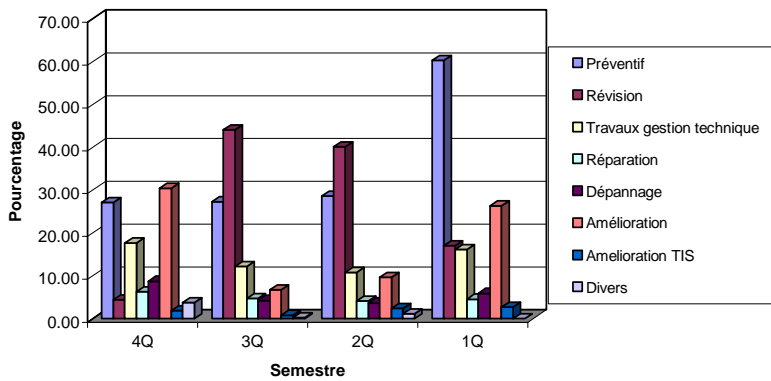
- the total number of interventions decreased by 221 or 36,1 %,
- the number of detectors decreased by 8,7% of a total of 5763 (numbers of the 31/12/2000),
- the number of undetermined interventions (NDE) and the perturbations faults (DDS) have decreased by 203 or 43,3 %.

2.2 Heavy Handling ST-HM

2.2.1 Type of Work in Hours and Percentage [4]

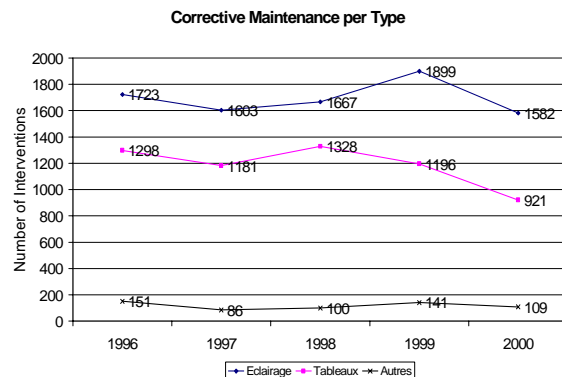
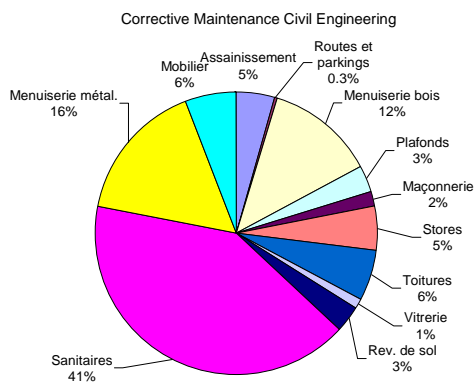
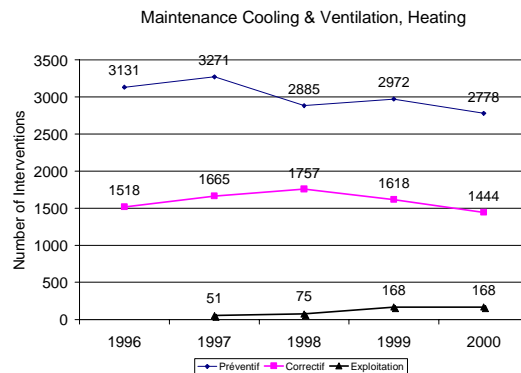
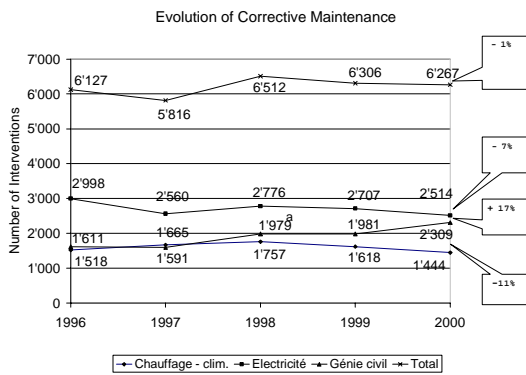


2.2.2 Type of Work in Percentage [4]x



2.3 Technical Facility Management ST-TFM

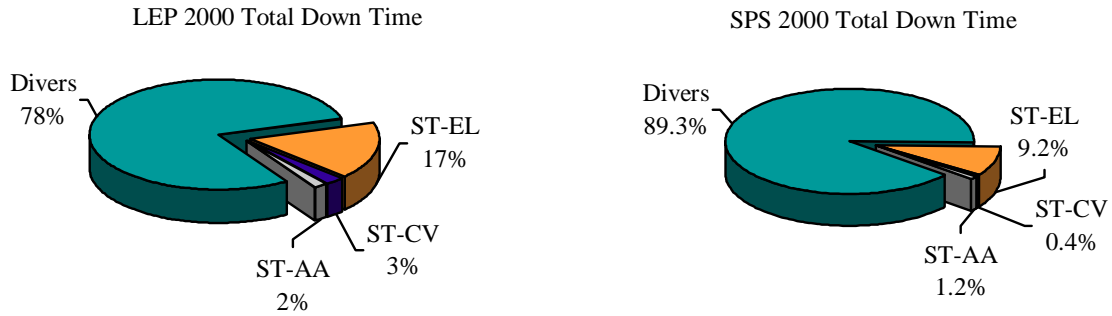
2.3.1 Evolution of Maintenance in the domains of Cooling/Ventilation-Heating, Electricity and Civil Engineering [5]



3 ACCELERATOR INFRASTRUCTURE OPERATION

The accelerator down time that is attributed to the different ST equipment groups consists exclusively of the time that has been caused by a fault in the respective equipment. It is counted from the occurrence of the fault until the accelerator is back to the state before the fault. Down time hours of the injectors are not counted in the down stream accelerators.

3.1 SPS and LEP Down Time [6]

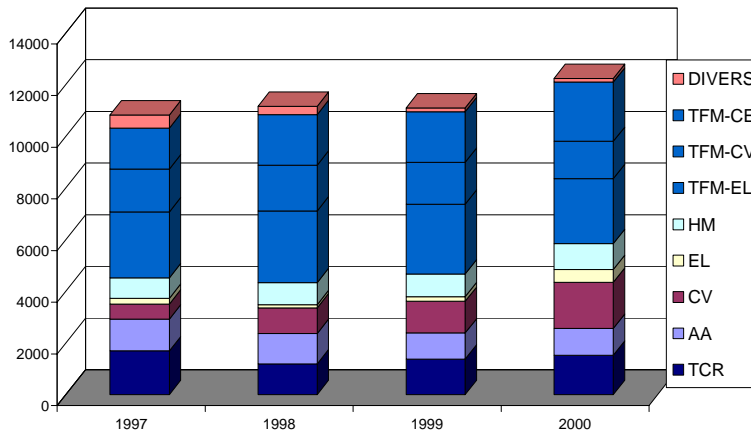


3.2 PS Complex Down Time [7]

For the PS complex detailed statistics could not be delivered. According to the numbers of the ST division the CPS was stopped 8 hours due to faults of ST-EL equipment and 14,5 hours due to faults in ST-CV equipment.

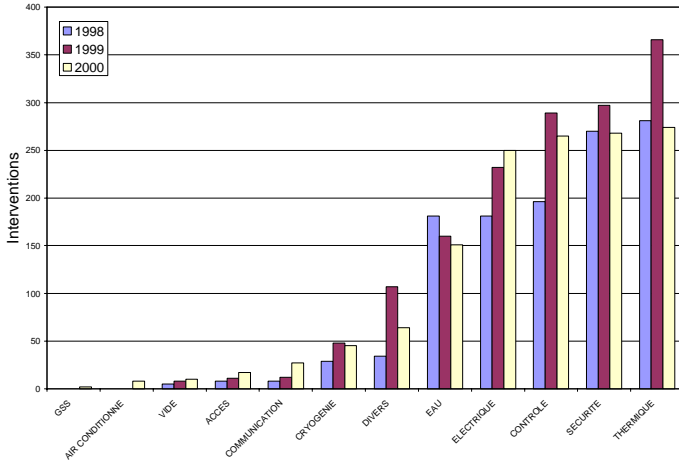
3.3 Monitoring and Operation ST-MO

3.3.1 Work Requests



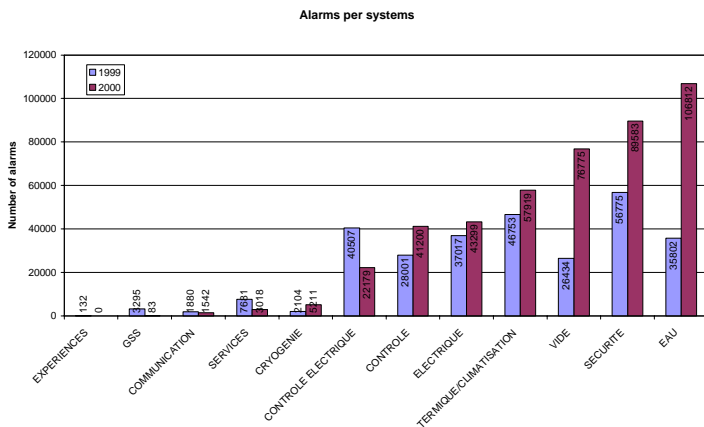
The total number of work requests has increased by 10% to over 12000 per year. More work requests have been dispatched to ST-CV and ST-EL than in 1999. However, only half of the work request to ST-EL passed via the TCR. The TCR workload due to TFM remained constant over past for years at about 30%.

3.3.2 TCR On-Site Interventions

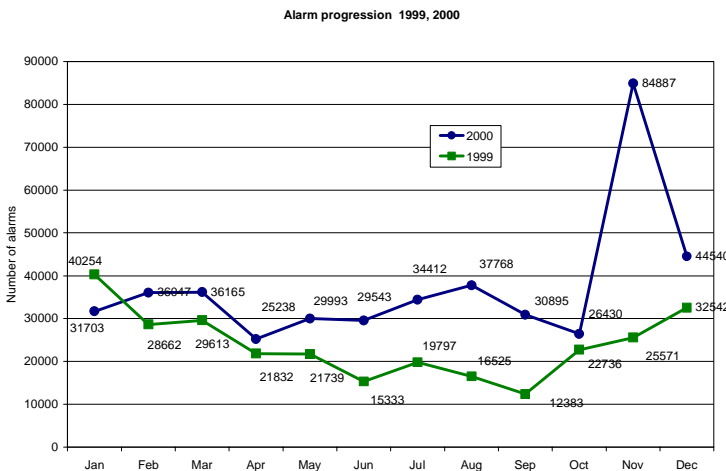


The number of TCR on-site interventions is stable over the last years, as well as the dominant domains of work. The TCR interventions represent nearly 10% of the total work requests dispatched.

3.3.3 Alarms



Even though great efforts have been made to limit the number of alarms in the TCR, the total number of alarms increased by 15,5% with respect to 1999. A considerable amount of alarms is due to the LEP dismantling and the Water 2000 project at the end of the year. However, there were more equipment tests during the year 2000 than in 1999, the TCR took the monitoring of the SPS vacuum and the problem of the cryogenics systems of LEP caused many alarms. An increasing number of safety related alarms of level zero was surprising; more than 6000 only in the month of August.

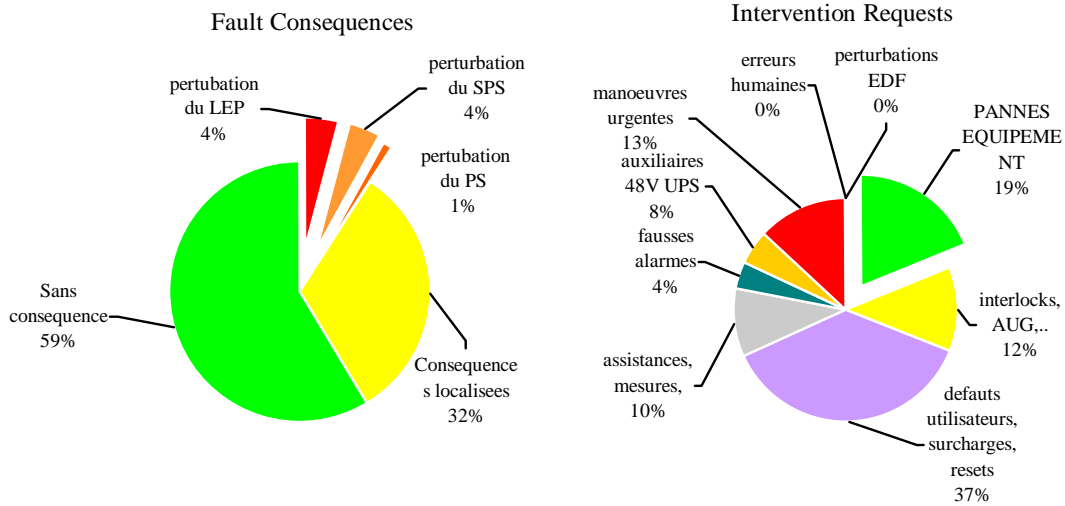


3.3.4 Comments

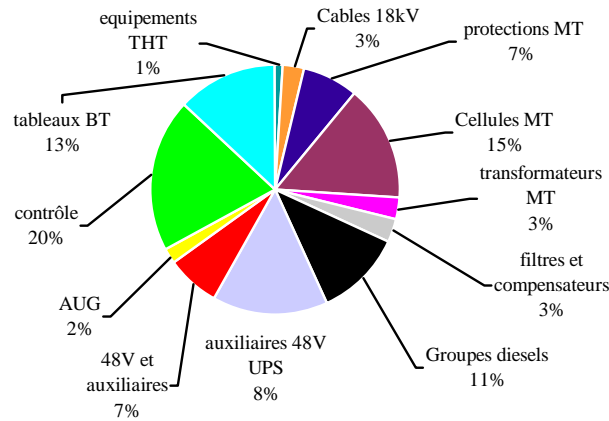
The total workload of the TCR operators increased by about 12% with respect to 1999, considering the stable number of on-site interventions and the increase in work requests and alarms.

3.4 Electricity ST-EL

3.4.1 Intervention Requests and Fault Consequences [8]

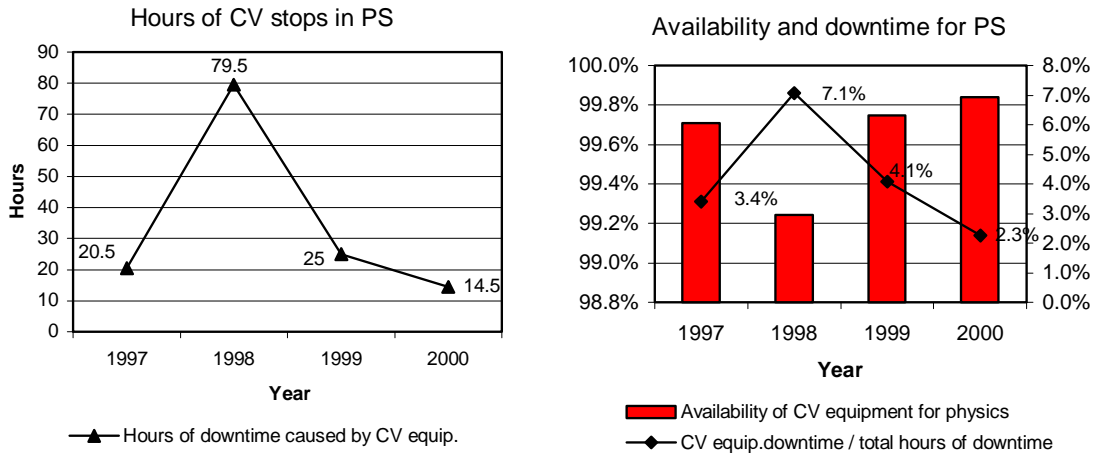


3.4.2 Equipment Faults [7]

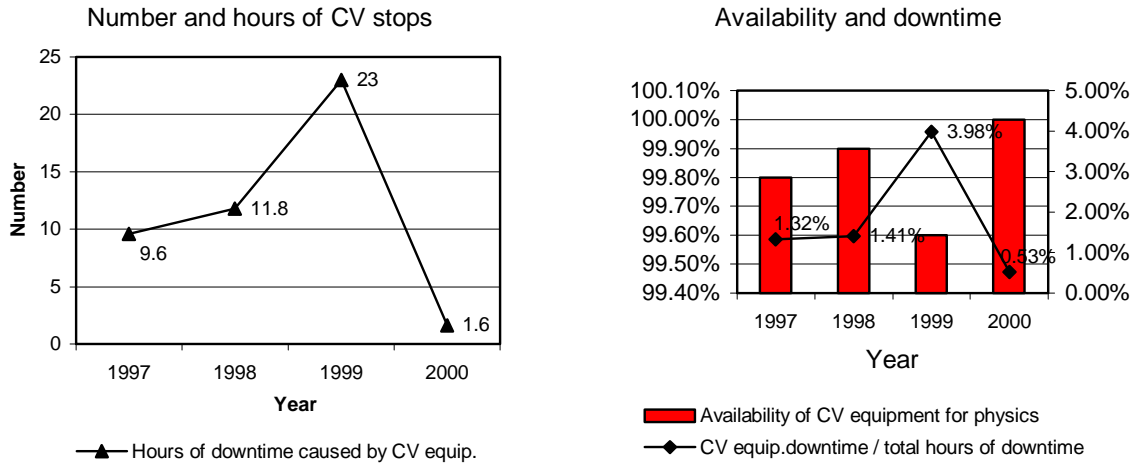


3.5 Cooling and Ventilation ST-CV

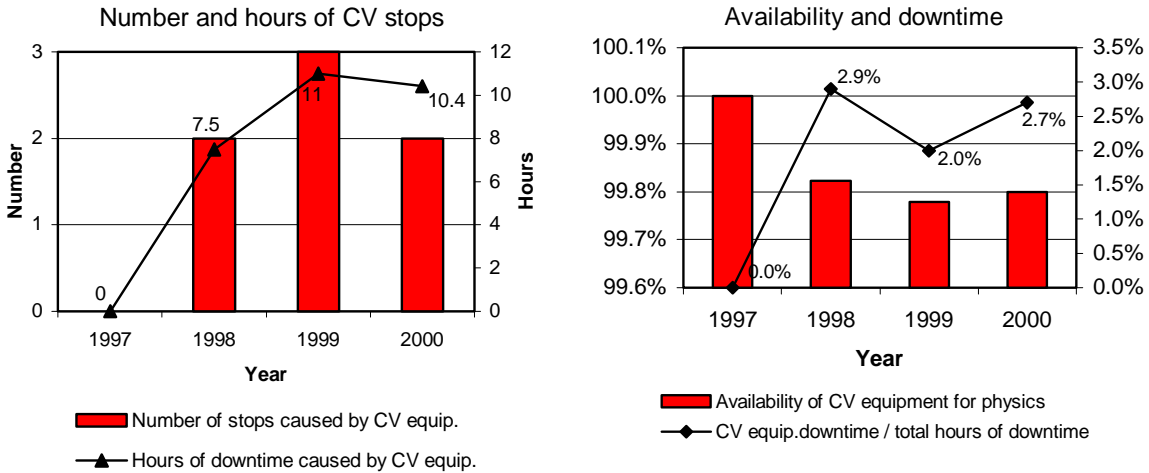
3.5.1 Down Time Hours Complex PS and Linacs for Leptons and Protons [9]



3.5.2 Down Time Hours SPS for Leptons, Protons and Ions [9]



3.5.3 Down Time Hours LEP [9]



4 CONCLUSIONS

A summary of the operation of CERN's technical infrastructure by the ST division has been drawn up. The data and data sources have been multiplied and synchronized as much as possible with respect to previous statistics. The ST Operation Working Group has set the guidelines for these statistics but only part of them could be implemented due to technical limitations or the unavailability of certain data. With the help of the ST Accelerator Incident Report that will be implemented, more data on the physics down time will be available in the future. The preparation for the LHC operation can start. With respect to the increasing workload in the TCR measures have to be taken to assure a good quality for the LHC.

ACKNOWLEDGEMENTS

The creation of this paper was only possible thanks to the commitment of any of the persons who furnished the data on the technical infrastructure operation. In particular we have to thank all the members of the operation working.

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