

# Run Coordinator Shift Report

## Introduction

This document has three parts

1. a report on the past shift period, running from January 2005 through May 2006
2. observations on the performance during that past shift period, based on data in the report
3. recommendations for shift load and credit accounting for the upcoming shift period, based on those observations

An institution, once a member of MINOS, can elect to name members of their group to the MINOS Authors list, following guidelines set by the MINOS Institutional Board (IB). However, every Author entails an obligation for the institution to the operation of the experiment, namely experiment shifts. A shift quota per author is calculated from the number of expected shifts during a given year, divided by the total number of MINOS Authors as listed at the start of the shift period. The institutional shift quota for a given shift year is the shift quota per author times the number of authors at the institution.

The number of Authors, both total and per institution, is derived from the Authors list at the start of a given shift year. The actual number of authors will change slightly during the course of any year. Some people leave and become legacy authors, no longer available for shift, yet are still counted in their institution's shift quota for that year because they were Authors at the start of the shift year. On the other hand, new collaborators arrive, who are available for shifts, yet are not counted in their institution's shift obligation, because they must be collaborators for 1 year before becoming an Author. On average departures and arrivals balance out for most institutions over the course of a year.

## Part 1. Report on the past Shift Period

### Number of Shifts and Number of Authors

The first MINOS shift period ran from January 10, 2005 to June 4, 2006. This period includes the NuMI Beam commissioning period at the start, and also includes a 14-week Accelerator Shutdown at the end. The MINOS Control Room shift schedule changed during this period. We started out with 3 8-hr shifts per day, each staffed by 2 shifters and no "overlap" between shifts. We changed to 4 7-hr shifts per day, with 1-hr of overlap between each shift, and each shift staffed by a single shifter. The Far Detector had been running for nearly 2 years before beam, and did not require constant physicist staffing; therefore shifts at Soudan, while included within the shift scheduling system, were deemed optional, and not required to be filled. During the Accelerator Shutdown, all Control Room shifts were canceled, however the optional Soudan shifts were retained.

So how many shifts were within this first shift period?

Sub-Period	MINOS CR Shifts	Soudan shifts
Beam Commissioning 1/10/05 – 2/13/05	5 weeks, 2 day shifts/wk 10 shifts	1/10 filled
Shift Structure A 2/14/05 – 11/13/05	39 weeks, 6 shifts/wk 234 shifts	39 weeks, 2 shifts/wk 17/78 filled

Shift Structure B 11/14/05 – 2/26/06	15 weeks, 4 shifts/wk 60 shifts	15 weeks, 2 shifts/wk 2/30 filled
Accelerator Shutdown 2/27/06 – 6/4/06	14 weeks No shifts	14 weeks, 2 shifts/wk 10/28 filled

Since the Soudan shifts are optional, it seems best to count only those which were filled toward the total number of shifts. The total number of Control Room shifts was 304, the total number of filled Soudan shifts was 30, and the total of all these shifts was 334.

The total number of Authors for the first running period was 165. This number is taken from the minosinst.txt file dated May 2005. It is a count only of Authors current as of that date. Legacy authors are not included in the count. New collaborators are also not included in the count. New collaborators become Authors after 1 year of MINOS membership.

The expected Quota for each Institution, was  $334 / 165 = 2.02$  shifts per Author. This is identical to the 2 shifts per Author which institutions were asked to fulfill when the NuMI beam started operations.

### **Shift and Non-Shift Credits**

Shifts are assigned a credit value. Some credit value is also given to other work. The credits are tallied by institution. The total credits accumulated by an institution, divided by the number of Authors at that institution, gives the institution's Rating. After a year of running the experiment, an institution's Rating should equal or slightly exceed their Quota if they are contributing as agreed to the experiment.

Each 1-week shift is given 1 shift credit. All detector shifts had the same credit value during 2005-2006.

Non-shift credits were granted for aspects of NuMI beam work, and also for doing shifts on the MIPP experiment.

Beam work credits were accounted for in two ways: a "fixed price contract" method and a "time spent" method. The "time spent" method is simply a tally of hours of work; 56 hours of NuMI beam work was given 1 MINOS shift credit (7 days, 8hrs per day). The "fixed price contract" method applied an agreed upon number of credits, no matter what the hours actually spent doing NuMI beam work.

Beam work credits were applied during the beam commissioning period (Jan-May 2005) and for the rest of the running until the Shutdown, but with different criteria in the two periods. During commissioning, NuMI beam experts took shifts in the Main Control Room; their time on shift was recorded by Peter Lucas who then handed it to the Run Coordinator.

For the remainder of the run period, the MCR Operators ran the beam on a day-to-day basis, with NuMI experts on call. The same NuMI experts also performed occasional studies for the purpose of improving the NuMI beam; these studies involved the NuMI beam, or the Main Injector, or the Booster, or all of them together. The NuMI beam experts were asked how many hours were spent doing "on-call" work and doing beam studies work, and they reported their hours to the Run Coordinator.

The total hours reported per individual during both commissioning and normal running was credited using the "time spent" method, and those credits applied to their institution. In the special case where an individual has a joint appointment with two institutions (Phil Adamson, joint London and Fermilab), the beam credits are split between the institutions.

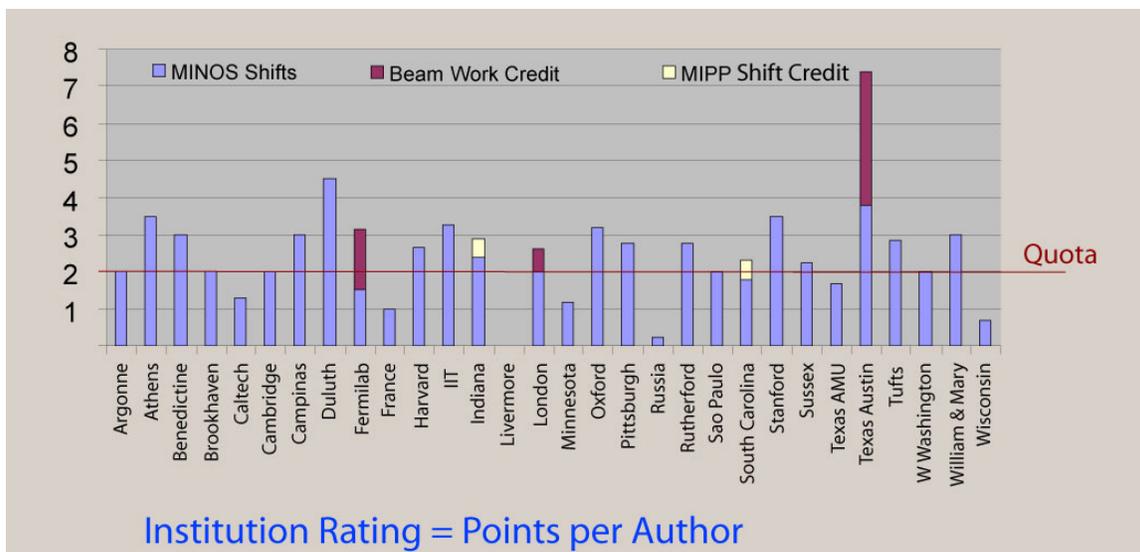
The “fixed price contract” method was used only by U Texas-Austin; they received a fixed amount of 18 beam credits: 6 each for 3 people. The amount was agreed upon before NuMI running began, and stemmed from discussions between the spokespersons and Sasha Kopp.

Credit was also given to MINOS collaborators who did shifts on the MIPP experiment between Nov 2005 and Feb 2006. They received ½ MINOS shift credit for every 56-hours of shift on MIPP. These credits were applied to their institutions. This credit was granted by the MINOS spokesperson in a discussion with Mark Messier.

## Part 2: Observations on Performance 2005-2006

### Institutional Ratings

The Rating for each Institution is summarized in the graph below. Note that the 3 Russian institutions have been grouped together into a single entry.



The Rating is the total points accrued to each institution divided by the number of Authors at the institution, as declared in the Spring 2005. The target Quota per institution was 2 points per Author. The blue, red and white portions of the bars indicate points from regular MINOS shifts, from beam work, and from MIPP shifts, respectively.

The detailed accounting used to produce this graph is recorded on web pages within the MINOS Shift Scheduler. The Shift Scheduler home page is reached by a menu-link from the MINOS Control Room home page. Once on the Shift Scheduler home page, select the link “2005-2006 Statistics” under the Shift Statistics menu heading. From there, use the “2005-2006 Institution Index” link to reach that Index; on that page, each Institution Name is a link to it’s shift summary page for this shift period.

### Filling Shifts

In general shifts were signed up for well before-hand, and shifters arrived and did an excellent job running the experiment.

The winter holiday period was not as difficult to fill as was initially expected, but this was because certain local collaborators withheld doing shifts, or rather saved their shift obligation, until the holiday period.

A somewhat unexpected difficulty was filling shifts during collaboration meetings when the meeting was not held at Fermilab. In the time period when we used Shift Structure A, with 2 people per shift, there were a few times when only 1 person signed up, and as far as can be determined from the eLog, there was indeed only one person present for those shifts. This occurred on 8 shifts, and they were always during or close to the time of a collaboration meeting which was not located at Fermilab. These 8 unfilled shifts are still counted in the total shifts for 2005-2006.

As expected, the night shifts were sometimes difficult to fill, and sometimes required prodding from the Run Coordinator, but we never had to resort to assigning shifts. However, this was in part due to the residency at Fermilab of a single graduate student (Panos), who did many more shifts than was required by his institution's quota. This one student did many night shifts, and if he had not been present those shifts might have required forced assignment to get them filled by others.

### **Non-Shift Credits**

The beam-work credits were intended to encourage work on the NuMI beam by institutions besides Fermilab, the theory being that people will not choose to spend time on beam work if they are also required to spend a quantity of time at Fermilab doing experiment shifts. However, in all cases, the institutions which received beam work credits would have met their shift quota without adding on the beam credits – with the exception of Fermilab.

The first year of beam running was a good time to apply beam credits, as the time required to operate the beam was then unknown. With many months of regular beam operations now behind us, we can use past performance to estimate the load on the collaboration to operate the beam in future. Past performance tells us that the load is not high. The beam commissioning period required many hours of many people, but the regular beam operations period shows the number of total people-hours decreasing, although those hours became concentrated in a smaller number of people. These few people were for the most part Fermilab (as expected); and some of this group did MINOS shifts in addition to their beam work.

The MIPP shift credits were an offer to help to institutions which felt burdened by participating in two experiments. However, as for the beam credits, all institutions which received MIPP shift credits would have met their MINOS quota without using the credits, except one - Livermore. Livermore, however, had a prior agreement with the MINOS spokespersons that it's work on MIPP – installation, running shifts, and analyzing the data taken on the NuMI target, would constitute their MINOS contribution for 2005.

In both descriptions of non-shift credits, note that verbal agreement with the spokespersons was involved, rather than a petition to and decision from the IB. While these agreements are honored for 2005-2006, the situation makes for some disorganization. The concept of beam credits was approved by the IB, but no accounting method was specified. The particular "fixed price" amount of credit applied to U Texas-Austin was determined privately between Doug Michael and Sasha Kopp. No other institutions which utilized beam-work credits had any similar agreement, at least none that they can recall. These institutions agreed to use the "time spent" method of credit when it was proposed. As a result, the beam-work credits were not uniformly applied.

## **Part 3: Recommendations for the 2006-2007 Running Period**

### **Non-Shift Credits**

The shift load is reduced for the 2006-2007 shift period, due to the shift schedule introduced in November 2005. This new schedule was not in effect for long enough in the 2005-2006 shift period to change the initial shift quota by very much. The new shift schedule requires fewer collaborators per week. The quota for 2006-2007 is closer to 1 shift-week per Author. The precise quota is not yet known, because some institutions have not yet updated their Author list.

Based on the reduced shift quota, and on the effects of special non-shift credits in the previous run period, the Run Coordinator requests that **no non-shift credits** be applied for the next running period.

As stated in Section 2 above, in nearly all cases, institutions which utilized non-shift credits were able to meet their quota without the benefit of the special credits. This would imply that meeting an *institution's* shift quota does not interfere with the *institution's* involvement in other work – note the emphasis on the institution. While it is true that specific individuals may need to choose to work on either the MINOS experiment or on the NuMI beam, their institution is able to “cover” for them in order to meet the institution’s MINOS shift quota. Such coverage has worked so far because the institutions in question have sufficient personnel to supply the coverage. The Run Coordinator can imagine a scenario where a very small institution, working heavily on the NuMI beam, might request a renewal of non-shift credits, but this case does not yet exist within the collaboration.

The negative aspect of having special non-shift credits is the perceived fairness among other collaborators. Your current Run Coordinator had not even taken on the full job yet when she started to hear from various collaborators about how their work on data processing, or as an on-call expert, or on data analysis, was just as important and time-consuming as work on the NuMI beam, and that they should also get non-shift credits. This topic can be debated endlessly. Whatever the truth about the relative merits of non-shift work, what is obvious is the perception that one’s equals (Authors) are being treated differently. A happy collaboration is important, particularly from the point of view of keeping the daily operations staffed with willing shifters. The MINOS experiment is fairly easy to run, and the shift obligation is low. The connection between the status of being an Author, and the responsibility that entails to operating the experiment, should be maintained, and done so in an equitable and fair manner.

### **Points per Shift**

During the last shift period, all shifts accrued the same point values. This seemed to work in general, although the Run Coordinator did need to prod the collaboration to fill some periods. Signup for the current shift period has been open for a couple of weeks as of this writing, and the response has not been overwhelming. Only ONE night shift has been filled.

The first week of beam after the Shutdown unfortunately coincides with the collaboration meeting in Boston, a situation in the past which also has made for difficulty in filling shifts. And indeed as of this writing, NONE of the shifts during the collaboration meeting have been filled.

As an encouragement, the points for night shift can be increased to 1.25 or 1.5. Likewise points for certain shifts at certain times, like the collaboration meeting, can be increased. But the Run Coordinator would like to try “beating the bushes” a bit before manipulating the shift points.