Day In the Life Of Studies (DILO’s)

Methodology, Tips & Traps, FAQs
Day in the Life of Studies (DILOs) give us and the client a powerful insight into what’s really happening “on the shop floor”...

What is a DILO?
• A DILO is a minute by minute review of each and every activity performed by an individual as well as observations, quotes, comments or any other data collected by the person performing the study.

Why use a DILO?
• To show the client a detailed “film” of what really happens day-to-day in his operation
• To identify the types, quantity and causes of non-value added activities
• To assess supervisory behaviors and effectiveness
• To identify operational issues, their root causes and impactability
• To gain a understanding of the environment and culture

There are 2 types of DILO’s, one is for supervisory positions and the second is for an operator.
What’s the difference between a supervisory study and an operator DILO?

- **Operator DILOs**
  - Focus on identifying and quantifying value-added (VA) vs non-value-added (NVA) time
  - Color coded narrative: VA is green, NVA is red
  - Quantified conclusions on impactability of NVA

- **Supervisory Studies**
  - Focus on assessing the supervisor’s time in 6 key categories (color coded)
  - Contrast actual time spent with “Perceived” – (how he thought he spent the day) – and “Ideal” – (how he’d like to spend his days)
  - Input to assessment of behavioral change and training needs

In both cases, the objective of the study is not a personal evaluation, but to understand what issues and problems arise on a day to day basis and how that supervisor or operator reacts to the problems. This in turn will highlight many issues such as productivity improvement opportunities, system deficiencies, skills gaps, morale issues, technical problems, unclear roles and responsibilities etc.
How to conduct a DILO – the basics for either type of study...

• The study should be conducted over a full shift or working day
• Know beforehand what the individual’s working hours (including time and duration of breaks) should be – so you can assess late starts, break over-runs, early finishes; official break time is excluded from the time analysis
• Detail, detail, detail, detail. Collect as much detail during the study as is possible
• Take detailed notes – don’t rely on your memory – and get copies of critical documents (e.g. the daily plan, the work order he’s doing..)
• Don’t transition from one color code to the next without an explanation – must be clear why each block of time is coded the way it is
• Don’t leave the write up until the next day. You must do it that night and send out by the next morning with the summary slides
• Don’t comment on or criticize what you see while it’s happening; be sensitive to the perspective of the individual you’re studying
How to conduct a DILO – the basics continued...

• First question to ask is, “What is your job”—what do they do during the day, what are the responsibilities, who do they report to and then observe if this is what they actually did during the day
• Understand use of and compliance to system elements (w/o completeness, SOP use and compliance)
• Don’t let the subject spend too much time explaining things, wait for intervals in the work which are obvious rather than letting the subject draw you into extended discussion which itself disrupts his day
• The text of the DILO should refer to the person you are following as ‘subject’—no names.
• Write down quotes about the job, organization, etc. They can be powerful material.
• Do ask, as well as objectively evaluate, whether it is a “typical” day
The key to a successful study is in the planning & set up...

Before starting a DILO, make sure you:

- have been briefed by the analyst as to the key issues in the area
- are clear on the objectives of the study, the outputs required and the information to collect
- have met the supervisor / operators the day before the study and set the study up properly
- have checked the day will be typical and not running unusual products, doing unusual activities
- have a basic understanding of the area via interviews etc.
- will be watching a significant machine/process/activity and have agreed this with the analyst
...as well as the execution and follow-up...

during the study:

- take notes as it happens - You will miss detail if you don’t
- collect all volume / waste info etc. as it happens – it often cannot be collected afterwards
- keep a dialogue going with the supervisor or operator to understand possible causes of problems as they occur - use their quotes / comments in the study

after the study

- Do follow-ups with supervisor, operator and other areas if necessary to get to root causes of problems
- ensure you’ve measured the day of study vs historical performance to see if the day of study is typical
- review the outputs with the analyst
- review the conclusions with the area manager
How you act and what you say is very important to building our credibility…

**DO’s**

1) Tell them:
   - Who we are and what we are doing; who asked us to be there
   - That their Supervisor has selected them as willing and available to sit with you. THANK them for all their time and efforts to explain their process.

2) Follow completely all safety requirements (clothing, PPE etc.)

3) Emphasize that our interest is in understanding the problems they typically face, the systems and processes they use – it is not an individual evaluation or a time & motion exercise

4) Listen – the questions you ask and the things you focus on will demonstrate whether point 3 is the truth!

**DO NOT’s**

1) Comment, criticize or make jokes about the speed or quality of the work; don’t share your judgements on what is VA/NVA during the study

2) Use a “stop watch”

3) Confront or try and problem solve for them – leave that for the project!

4) Don’t write vague comments like: “Entered something into computer” YOU MUST know what they are entering, into what system. You can’t always sit quietly. Sometimes you must ask intrusive questions.

5) Forget your common sense – you don’t have to follow people to the bathroom!
The best operator DILOs will contain the following elements...

**process**
- based on critical activities / major volume machines in an area
- links to key issues identified in pre-analysis outputs
- observation performed on a typical day
- observed problems and stories have been followed up to identify root cause
- names
  - states factual performance, not subjective view
- quantified conclusions - what is impactable vs non-impactable
- is positioned - that day vs historical performance of area / line/individual; actual vs standard
- conclusions and detail reviewed and agreed by area manager (once analyst has seen the outputs
- improvements are stretching but realistic (eg safety implications checked, future capex plans checked

**layout & detail**
- consistency with outputs agreed with analyst
- consistent with the way other area’s have been completed
- written in English, not ‘consult-speak’
- issues/conclusions summarized effectively
  - includes sources, dates, times,
- narrative contains the names of specific parts / machines /work orders and

n.b. These principles apply as much to detailed Machine Studies as to DILOs....
Some typical value added / non value added activity categories:

**value added:**
- working on job (give job no. or description)
- working in workshop (give product/part/job name or description)
- receiving direction/coaching from supervisor
- safety required job preparation
- filling in system documentation/entering required data to computer system

**non value added:**
- waiting for work
  - no job allocated
  - between jobs
- unofficial / excessive breaks
  - late start
  - over run on breaks
  - early finish
- unnecessary journeys to stores
  - pick up tools (which tools?)
  - pick up parts (which parts?)
- pacing
  - (which job? Compare actual time to historical avg. or best demonstrated to quantify pacing)
- waiting time - (for colleague? Permit?)
- Rework/NVA
  - job not completed correctly first time (which job? when first done? How long spent?)
  - repair job as PM not done (PM detail?)
  - extra time - not using correct tools (which tools?)
  - moving equipment unnecessarily (which equipment?)
Identifying root causes is critical to understanding how the problems in an area can be solved...

- **Problem:** Production line stopped for 2 hrs
  - **Symptom:** The conveyor broke down
  - **Symptom:** The motor had burnt out and had to be replaced
  - **Cause:** The motor should be checked monthly as part of a preventive maintenance routine, but the last 3 checks had not been carried out

  - Keep asking why
    - In most cases will be more than one possible cause so explore each possibility
    - Production will not have all the answers - here we would have talked to maintenance, stores, purchasing etc.

- **Problem:** Short shipped customer yesterday
  - **Symptom:** Did not make enough cakes yesterday
  - **Symptom:** Ran out of materials
  - **Symptom:** A lot of waste on this product yesterday
    - **Symptom:** No flour in stores even though system said it was there
    - **Symptom:** Most was because they were cut to wrong size
      - **Symptom:** Flour later found stored in wrong place - stores discipline
    - **Symptom:** Knife settings were wrong at start of product run
  - **Cause:** Performance engineers
Positioning the findings against history removes the ‘this was a one-off day’ excuse...

is 85% good or bad?

Best Demonstrated Performance
85% is typical

n.b. - don’t be put off by 85% appearing to be ‘good’ - it may be that the client’s efficiency measure is incorrect

- be consistent in the way you measure the day of study vs history - it is no good comparing OEE with previous efficiency if they are calculated differently

- compare whatever info you can - efficiency (if measured), volume / man hour or simply volume if nothing else exists
The comparison of best demonstrated and average performance suggests a considerable opportunity for improvement . . .

* The observed rate of 15.45 drums/hr was extrapolated over the full job
* 14.6 drums/hr was the actual achieved rate for the full job, next shift ran at 13.2 drums/hr
* The total recorded job time of 10 hours includes a 30 min setup and a 30 min cleanup time
Hemphill Plant Operator DILO – a good study does not have to be a high% NVA…

- Issues in the plant triggered by operator on earlier shift.
- Plants conditions poor, (countless lights inside and out were inoperable)
- Numerous alarms and meters were inoperable or incorrect
- Several samples were not taken but reported as if they had been taken. (as instructed by superintendent)
- No phosphate test were performed (No laboratory controls were available)
- Recently calibrated (by the lab) Turbidimeters are not relied upon by operators

Severe operational issues within the plant. Turbidity levels Exceeded tolerances, Chlorine levels peaking and numerous alarms. Operator extremely diligent, professional and dedicated. No lunches or breaks were taken.
Impactability Studies

Quantifying the improvement opportunity represented by the NVA time we have observed…
Impactability Studies

What is a Impactability Study?
• A detailed breakdown of the DILO which totals NVA time into various categories.

Why use Impactability Studies?
• To understand the types of NVA and estimate the potential to reduce the amount of NVA with planned improvements made over the course of a project

Note: that NVA will never be reduced to 0%. In some cases there will be little that anyone can do regarding NVA (i.e., positions which require a person to “man” a station)
How to perform a Impactability study

- Review the DILO
- Identify logical groupings for the types of NVA observed
- Determine the root cause(s) for each category of NVA
- Sum the total minutes for each category
- Calculate the percent of each category against the total DILO time
- Estimate the percent reduction that you believe is realistic; agree this with the project manager
- Calculate the revised NVA percentage
- Summarize the results
...NVA time is broken-out into specific categories that can be impacted by addressing the root causes...

Total observation time = 5920 mins = 99 hours

Total Non Value Added = 2591 min or 42 hrs

- **Rework**: 7%
- **Extended Breaks**: 9%
- **Looking For Parts**: 12%
- **Waiting For Work**: 14%
- **Looking For Parts (out of stock)**: 15%
- **Travel**: 16%
- **Waiting for Others**: 20%

Watching Others Work: 0.3%
Waiting on Others: 1%
Waiting for Production: 1%
Returning Parts: 1%
Getting Tools: 1%
Early Finish: 2%
Avoidable Work: 3%
...and applying different solutions:

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Root Cause</th>
<th>Mins</th>
<th>% Total</th>
<th>Impactability</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waiting for Parts</td>
<td>Inventory Control, Planning</td>
<td>808</td>
<td>17.5%</td>
<td>67%</td>
<td>5.7%</td>
</tr>
<tr>
<td>Extended Breaks</td>
<td>Short Interval Control, Daily Planning</td>
<td>523</td>
<td>11.3%</td>
<td>70%</td>
<td>3.3%</td>
</tr>
<tr>
<td>Looking for Parts</td>
<td>Inventory Control, Job Planning</td>
<td>282</td>
<td>6.1%</td>
<td>67%</td>
<td>2%</td>
</tr>
<tr>
<td>Rework</td>
<td>Job Planning, Training</td>
<td>163</td>
<td>3.5%</td>
<td>50%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Traveling</td>
<td>Job Planning</td>
<td>145</td>
<td>3.2%</td>
<td>50%</td>
<td>1.6%</td>
</tr>
<tr>
<td>Watching Others Work</td>
<td>Short Interval Control, Job Planning</td>
<td>114</td>
<td>2.5%</td>
<td>75%</td>
<td>1.6%</td>
</tr>
</tbody>
</table>
The solutions will produce a substantial increase on labor productivity:

<table>
<thead>
<tr>
<th>Total Non Value Added Time</th>
<th>Non Value Added percent of Total Time</th>
<th>Non Value Added percent of Total Time after Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>2241 minutes = 37.4 hours</td>
<td>49%</td>
<td>17%</td>
</tr>
</tbody>
</table>

Before

- Non Value Added: 49%
- Value Added: 51%

After

- Non Value Added: 17%
- Value Added: 83%

1463 minutes saved from 2241 total minutes
= 32% increase in current productivity

These examples are from various studies
Supervisory Studies
Supervisory studies:

- **Outputs and objectives :-**
  - Objective of the study is not personal evaluation, but to understand what issues and problems arise on a day to day basis and how that supervisor reacts to the problems. This in turn will highlight many issues such as system deficiencies, skills gaps, morale issues, technical problems etc.
  
  Clearly there is a thin line between evaluating the outputs objectively and using the outputs to personally criticize. It may well be appropriate in some instances to make the study anonymous.

- **The outputs therefore :-**
  - Clearly indicate the key issues and conclusions of the supervisors day and allow an impression to be built up of performance by using live examples to bring facts and critiques ‘alive’.
  - Summarize actual time spent in 6 major categories
  - Allow conclusions to be drawn on the supervisors ability to recognise his current activity set and its understanding of what its role should be (by looking at perceived and ideal summaries)
A supervisory study categorizes time in 6 major groups (in some contexts an additional category for travel time may be required...)

**Active management:**
- Essentially effective management time e.g. planning the next day/next week. Trying to anticipate problems before they occur. Work assignment.
- Will not include tasks such as sitting at PC designing new documents (may look productive, but this is admin time which could be delegated)
- Typically this is a small % of the day

**Passive management:**
- Reactive time i.e spent reacting to problems as they occur and either resolving them or continually dealing with them.
- Also includes time spent touring the floor passively checking on what’s happening.
- Part of a supervisors day will always be reactive - this is not necessarily ‘bad’ - the issue is the amount of time spent in reactive mode

**Available time:**
- When no specific tasks to do
- Overrun on breaks, social chatting
- Talking to consultant if lasts for 10 minutes+ and it is clear he has no other work
- Only an issue if lots of available time

**Manual work:**
- Time spent doing the work of an operator
- Not necessarily bad to be seen to be “mucking in”
- May be an issue if lots of manual work, but need to understand the role e.g. working charge hand you would expect a higher manual work content

**Administration:**
- Paperwork
- Telephone calls
- General time at desk
- PC time/E mail etc
- Will include meetings except that part of a meeting that supervisor playing a proactive part

**Training:**
- Time being trained
- Time doing training
- Meant to capture more formal training (coaching/guiding/advising may be active management).
Supervisory study:

**Typical key issues/points to look out for:**

- Note there is a thin line between active and passive supervision (active is quite a harsh measure) e.g. a supervisor who sees his line stopped due to lack of material and quickly resolves the issue is doing the right thing but this is reactive; the proactive supervisor would have checked what materials may be required 2 hours earlier and contacted the relevant department to deliver.

- What training has the supervisor had recently?

- How good is the interaction with his staff/his peers, what is his style, is he respected? If he attends a meeting, go too and critique both his participation and the meeting as a whole.

- Does he spend time regularly touring the floor or is he chained to his desk?

- Is he busy/stressed or under control?

- Does he exhibit good coaching skills?

- Any time spent looking forward? E.g. next months labour plan, next years budget etc.
Example of supervisory study summary charts...

Points to make:
- × too little active supervision - & he thinks he does more than he really does
- × a lot of admin time
- ✓ wants to do more training
Frequently Asked Questions…

- Who decides what is NVA and how impactable it is?
  - You make the initial assessment, then review and agree it with the analyst and the CP/PM
- When should I write up the DILO?
  - Straight after you’ve done it, i.e. that evening. Not only does this prevent a backlog building up, but it will help that events are fresh in your mind, and any follow-up questions can be dealt with promptly
- What if the subject wants to read my notes while I’m doing the DILO?
  - Let him – and be sure that you don’t write anything other than your factual observations, quotes etc.! However we only review the completed study (including the VA/NVA and our comments) with his supervisor.
- What do I do if he says he has a private meeting he doesn’t want me to attend?
  - Use common sense, and if necessary exclude the time from the DILO
F.A.Q.’s (cont.)

• Is travelling time red or green?
  – “Extra” journeys (e.g. return to shop from job site to fetch forgotten tools) are always red
  – Initial journey to job site green
  – For “roving” operator may require creating an additional “travelling” time category
  – As ever, use your judgement – if you were paying the individual, would you want him to do it?
Contactgegevens:

E  info@axisto.nl
T  +31 20 3120 413

Axisto B.V.
Atlas Arena
Hoogoorddreef 9
1101 BA Amsterdam

The Netherlands