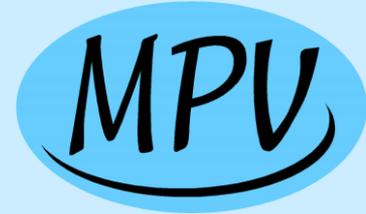


# Work profile and competencies of a test engineer (2004)

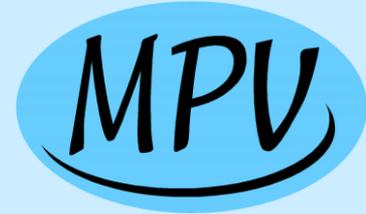


This presentation deals with the nature and profile of the work of a test engineer and the desired competencies. It gives an overview of the everyday skill areas and challenges of the work.



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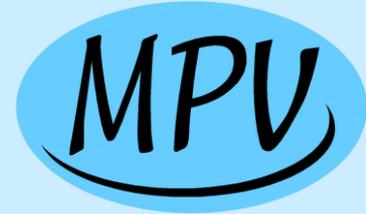


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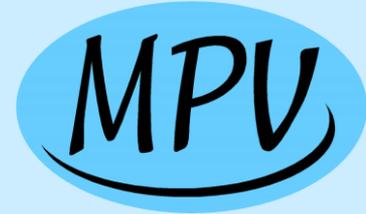
# Stereotypes of testing

- Testing often rises stereotypic thoughts of an activity where in clinical environment are done testing based on very exact specifications – somewhat like medical testing.
- Software testing is, however, living in chaos like the software development in today's hectic product development.
- The work of a test engineer is often imagined to very mechanistic and mechanical typing of test cases and registering the results. This is what it mostly is, but there is also plenty of room for planning, problem solving, communication, literary expression, creativity etc...
- Testing is a branch of people with low level of education and is an entry job in IT development companies.
- This presentation clarifies a little the reality of testing behind the organization charts and ideal models – a world of which few people have personal experience.



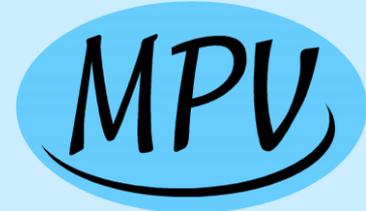
The test engineer is a professional in his/her domain

- The test engineer is a worker. Little by little the test engineer is becoming a profession in its own. People seek test engineer's job because of its nature, not because of necessity or because of a will to enter the IT branch. The backgrounds of the test engineers can be various kinds.
- The test engineer is not a secondary task, but more often the test engineer's job is a fulltime job, with other tasks done if time allows.
- The test engineer works in the line organisation and at the same time at a project organisation. The foreman can be the same, but it can also be a project manager, who is not a line foreman.



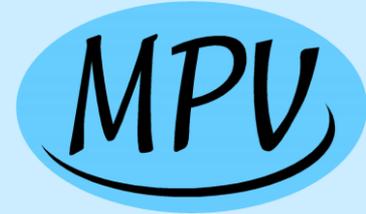
## One needs to feel one's professionalism!

- The test engineer deal with negative things (errors, mistakes made by other people). To handle this, one needs meanings and motives brought by the profession and the sense on one's own expertise.
- This is a special skill – finding errors is an important skill and task.
- The occupational competence brings a moral responsibility. If the client or foreman suggest that such testing methods are to be used that do not find errors well enough, this issue must be brought up. But on the opposite side of the coin, one must remember that testing is paid by the client and is in certain way a service! In that respect, the client always has the last word.



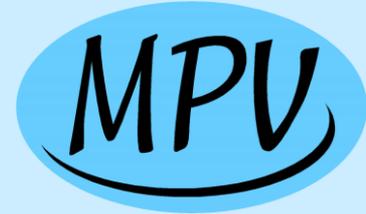
## What the test engineer does

- The contents of testing work – each takes about third of the time:
  - Planning of testing.
  - Executing the tests.
  - Reporting the tests.
- Not all do the planning of tests, only the more experienced and trained test engineers. Often the career begins with executing tests planned by others. The job profile is clear: execute the tests that the foreman gives you to test.



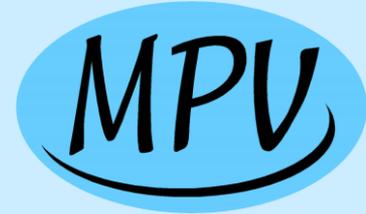
## What is the executing off tests like

- Tests are often executed according to readymade plans, systematically and exactly.
- Executing of the tests is not mechanical typing of the test cases into the computer, but for example the installation of applications and controlling of test environments takes a lot of time.
- Executing of the tests is not only work of an individual, but the work is often done in a testing team, where the observations are discussed (have others run into this? Etc...). Co-operation is important.
- Although the testing is often planned beforehand, one needs to be able to find errors creatively. Recognise the functions that are prone to faults and disturbances that imply a possible error. A good test engineer has a strong "hunch" of problems, brought by experience.



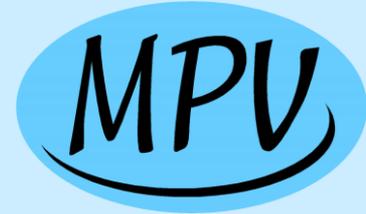
## Instructions of testing

- The project manager decides how testing assignment is carried out.
- People often work according to the client's orders: what tests are done, what kind of forms and documents are used, etc...
- For things that are not otherwise specified, the guidelines, forms, checklists etc. in the company's quality management system are used.



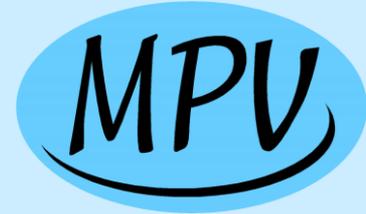
## Written presentation skills important

- Written presentation skills are in an important role. The errors must be communicated clearly – nowadays often in English, no matter what country one works in. English can be a foreign language to the readers of the error reports too, so the expressions must be of good quality.
- Depending on the ways of the company, a good English oral communication skill can be required. The test engineers who do test planning must every day more often review the plans in meetings that are carried out in English.



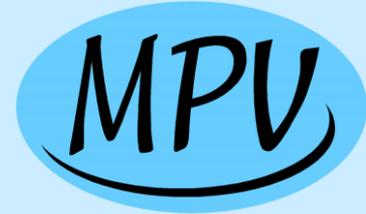
# Team work is important

- Testing is rarely done alone. Mostly it is done in a team that has many other people in many roles.



## Management and co-operation roles 1/2

- Project manager
- Most projects have a project manager who manages and leads the testing team.
- Deputy project manager
- Often the deputy group manager. Leads the project when the project manager is unavailable.
- Contact person / responsible person
- In project which have no project manager (project manager provided by client) requires a person who:
  - Participates in meetings in-house and at the client.
  - Delegates the given tasks to others.
  - Informs the test team and possibly managers of the agreed things.
  - Needs some managerial rights, for example a right to decide of short leaves; notices of sick leaves can be given to the contact person, not necessarily to the supervisor.

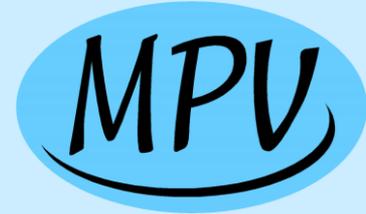


## Management and co-operation roles 2/2

- He/she is an equal member of the testing team who just has been appointed to the tasks of the contact person.
- This way of organisation is problematic, as we operate on client's project under the management of the client's foreman. The team doesn't necessarily get sufficient guidance and monitoring. Therefore, all projects should have a local project manager with at least 20 % resourcing of working hours.
- Because this way of operating can be new to test engineers, all tasks in the project must be reviewed when the project starts, so that there are no misunderstandings regarding the tasks and roles.

## Responsibility roles in concrete tasks 1/3

- Testing planner
  - A specialist of testing planning. Often an experienced test engineer or the project manager does the test planning.
- Test specification responsible person
  - Is responsible of the quality of the test specifications and that they are kept up-to-date. Again, often the task of the project/group manager, but this does not have to be.
- Material responsible person
  - Plans and maintains lists of articles that the project has in its use, including those that are in loan or are loaned to others. Often the project manager.
- Installation responsible
  - Has good knowledge of hardware, Windows drivers and experience of installing hardware. Takes care of installing operating systems and hardware to test workstations or at least plans those first and then consults the others.

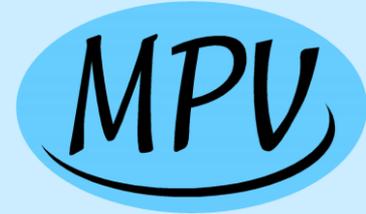


## Responsibility roles in concrete tasks 2/3

- Flashing responsible
  - Is able to do flashing of phones and other devices. Maintains the project's files on the flashing workstation, is the best person to study flashing problems.
- Responsibility of a part of some test area (like Fax-Modem setup test engineer)
  - Sometimes a large area of testing has been divided into personal responsibility areas. This can have problems because the division can be uneven: someone can be responsible of a very buggy area requiring a lot of work and someone else has only little work. There is also the problem that when the responsible person is not at work, nobody else can do the testing without spending some time in learning it first. This can cause a slip in a tight testing schedule.
  - Normally task rotation is used. This aims that more than one person is proficient in every test area. In some especially demanding one time testing tasks, personal responsibility roles can be used. But the skills should be shared in the next projects and the challenging task turned into a shared routine.

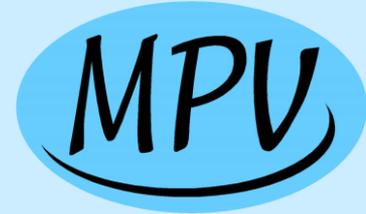
## Responsibility roles in concrete tasks 3/3

- Test automation planner / expert
  - Test planner or test engineers can do test automation planning, but often there are specialist experts who:
    - Know test automation programs very well
    - Can plan automated tests and test sets
    - Can plan what tests in the software project will be automated
    - Can help test engineers in using automated test applications and in problem solving.



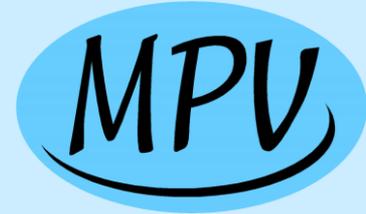
## Every day problems of the test engineer 1/4

- The job of the test engineer is not a bed of roses. The following list some practical things that a test engineer should mentally prepare for, because they are a part of the every day life in most testing organisations.
- Specifications, functional specs etc. documents, that the software developers should create, are not up-to-date. They are either incomplete or not available at all, for example reasons of security. How is one supposed to know what to test?
  - It is important that the test engineers have general knowledge of how different kinds of programs work. Most part of the functionality of programs is based on a general logic – like phones, office applications and just some part requires written specifications.
  - Yet one should be active and emphasise to the project manager that the documents should be gotten from the client. Perhaps the delivery it has been forgotten.
  - Sometimes the test engineers begin to themselves create a specification for the software based on the information they got.



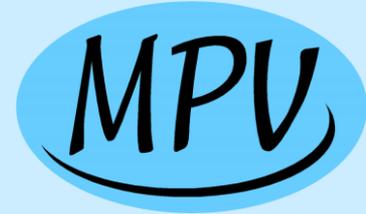
## Every day problems of the test engineer 2/4

- In reviewing the test plans, the software designers are rarely present.
  - It is difficult to get information of how the program should work.
  - People make unnecessary work and the errors are found too late.
- The test engineers and programmers speak a "different language".
- The programmers rarely know how the application works as a whole. They just know their own module, but do not necessarily know the total system. The test engineer on the other hand has to be interested on the functionality of the whole program.
- Maintaining the test environment, the applications and its parts takes time and is work that feels unnecessary. Easy installation of a program still under development is not at the top in the priority list of the software developers.



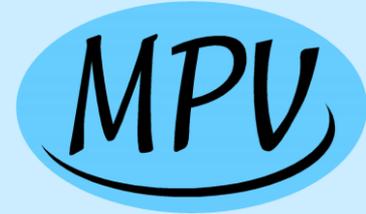
## Every day problems of the test engineer 3/4

- Error database is nowadays one of the most important tools. In a distributed software development it can surprisingly often not work. Fixing problems can take a while unless it is maintained by the product development team.
- Organising of work can be lacking in small and busy organisations.
- Amount of work can vary a lot. Sometimes there is nothing to test and sometimes there is too much work.
- Projects take longer than planned and schedules change. Testing can be reduced because of pressures on schedule and money – and still the quality of testing should remain the same!
- Because of the hurry and a large amount of bugs, some product features are dropped off the product. The test engineer can feel his/her work (testing of the dropped features) to be worthless and wasted. This is not so, because there are always very grave reasons for the dropping of features.



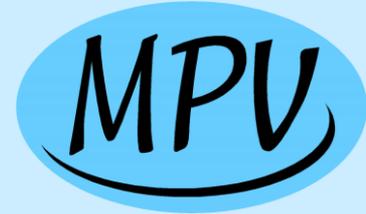
## Every day problems of the test engineer 4/4

- Testing can sometimes be a lone burden, but the testing team can give good support in good testing teams and companies. Good managers maintain a good group spirit actively.
- If the project doesn't seem to end, the testing can get boring. For example, after testing a feature 20 times, it is not so exciting. This decreases the quality of testing. The areas of testing should be rotated; otherwise the bugs will not be caught.
- The role of the testing project manager depends on whether he/she is participating in the testing or just a managerial employee. The test engineer must take these kind of differing roles into consideration.



## The good test engineer: Strength of character...

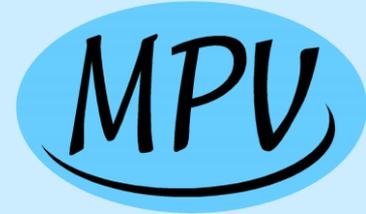
- Is systematic. The testing must be carried out according to the plans.
- Is accurate and careful. Testing is accurate work where little details matter the most.
- Is realistic regarding to the functioning of new technologies, applications and products. The test engineers can be in the software development team as a counter balance to the overly optimistic software designers.
- Is dependable. Testing is dealing with unreleased product that require absolute security about their existence and features.



## The good test engineer: Knowledge and skills

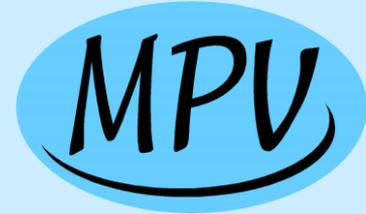
- Has competence on the theoretic principles of testing in appropriate level.
- Is able to analyse and interpret problems. What causes errors, why doesn't the test environment work as planned? But analysing the problems in the software is not the main task of the test engineer. Mostly he/she doesn't even have the tools to do that (source code or debugging tools), so finding out the reasons for errors must be left to the software developers.
- Communicates clearly both in writing and orally. The errors of the software must be reported clearly so that the software developers understand how the software behaves erroneously.
- A plus: Is suitably creative. Testing is not always just typing in simple test cases, but often requires improvising skills. But too creative or artistic people are not suitable for testing work.
- A plus: Has some level of programming skills. Basic programming skills help in estimating where there might be errors. In some types of testing it is necessary to be able to read program code, but not all.

# The good test engineer: Flexibility



- Is flexible in changing amount of work. Sometimes there is nothing to test, sometimes too much!

# The good test engineer: Social characteristics



- Has social skills. Has an active and positive customer service attitude when dealing with the clients.
- Is extrovert. Paradoxically, jobs like testing require people who immediately raise problems and keep the team spirit up.

## A programmer is not a good system test engineer

- This is a generalization – there are always exceptions.
- Why isn't a programmer a good test engineer?
  - His/her viewpoint is in code level, not in customer's/user's needs.
  - The product as whole and how it is used is not known well.
  - Programming and testing are in many ways different kinds of tasks.
  - Testing does not give similar challenges as testing, which will in the long range bring motivational problems.
  - A programmer is often overeducated.
  - A programmer has a too understanding relationship to the errors and to the work of the programmer colleagues.
- So, a proper test engineers should be used as a test engineer.

## How to recognise a good test engineer?

- The test engineers are usually sought by morning paper advertisements without recruiting offices.
- A job interview is at key position of the process.
- The job profile is such that there are no clear measures that could be used to predict a person's success as a test engineer.
- The feeling of two interviewers is often sufficient.
- The group or project manager must be interviewing – it is important to get a practical feel of the person.
- There are no known small suitability tests.
- Of course, the good recruiting practice must be used: asking the former employer etc. The client of the testing projects may have requirements too.
- It is important to recognize the persons that really wish to be a test engineer. If the person really wants to be a programmer, the employment might not necessarily become fruitful.
- Because of the professionalism of the occupation for example students and part time workers may not be a good solution.