OUTLINES OF THE WEBA-INSTRUMENT
A CONDITIONAL APPROACH FOR THE ASSESSMENT OF THE QUALITY OF WORK

A study ordered by the Ministery of Social Affairs and Employment (Labor Inspectorate) to operationalize the well-being section in the Dutch Working Environment Act.

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CONTENTS

1. INTRODUCTION

A new instrument for the assessment of the quality of work contents has been published in the Netherlands mid-1989 (Projectgroep WEBA, 1989). The development of this instrument was based on the well-being section of the ASA-instrument (Terra et al., 1988, Christis & Fortuin, 1989). The incentive for the development was the necessity to operationalize the relevant provisions on well-being in the Dutch Working Environment Act.
The resulting methodology, subsequently called the WEBA-instrument (Welzijn Bij de Arbeid, i.c. short for Well-Being during Work) or abbreviated to WEBA, distinguishes itself in an number of ways from existing instruments and approaches for the assessment of the quality of work.
In this paper the principle characteristics of the WEBA are explained.
The following figure outlines, in a nutshell, the framework of the WEBA:

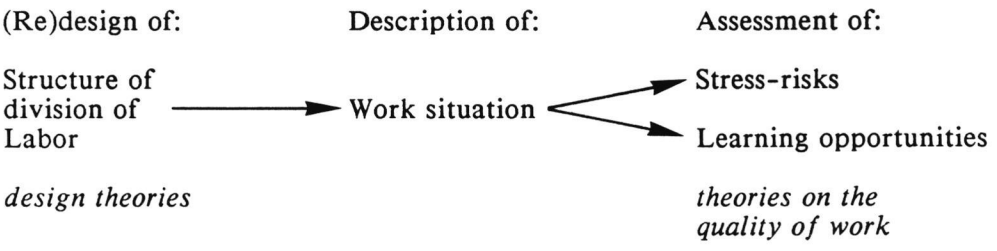

Fig. 1 WEBA as a bridge between theories of design and the quality of work

The WEBA assesses the quality of work in terms of risks for well-being (stress-risks and opportunities for learning).
Figure 1 represents the following reasoning underlying the WEBA: the well-being aspect of the quality of work is not a function of the workplace but of the work organization (de Sitter, 1986). Work situations are described in such a way that they:

- on the one hand can be assessed in terms of the presence of stress-risks and learning opportunities; and
- on the other hand can be related to the structure of the division of labor that constitutes these risks.

So with regard to the quality of work the WEBA-instrument refers to two essential conceptions.

1. The quality of work is related to well-being in terms of the risks and chances in the sphere of mental load and skills. This demands for the adaptation of appropriate theories on stress and learning (see par. 2.2. and 2.3).
   The quality of work improves when there are less risks of stress and more opportunities for learning. With this statement a connection is established with theories on the quality of work and well-being.
2. The quality of work is related to the design of jobs in terms of structures of the division of labor. Determinants of the quality of work can now be defined in more detail. This offers more possibilities to indicate improvements and focus on the quality of work in projects (re)designing jobs. This establishes a connection with theories of job design.

The first conception presumes that a specific theory on stress and on learning is developed. What constitutes stress in the work situation and how does it come into existence, resp. what constitutes learning in the work situation and under which conditions is this possible?
The second conception implies that work situations can be described in terms derived from the design theory called the modern socio-technical systems theory (de Sitter, 1989). This theory forms a suitable framework for the development of measures aimed at the improvement of the quality of work.

With the construction of the WEBA-instrument a contribution is made to the international discussion with regard to the three following issues:

(1) The necessity of a bridge between the quality of work and (re)designing jobs (Karasek, 1989, Hacker, 1986)
(2) The "how" of integral design and the role of modern socio-technology (Brödner, 1985; Sorge, 1985; Clegg & Corbett, 1987)
(3) The issues of stress and learning.

With regard to our approach to the last issue we would like to make the following remarks. In this field there are a great number of partly contradictory, partly compatible approaches. For a critical discussion see Christis (1989, 1990). The conclusions of this discussion can be summarized as follows:

* The WEBA estimates risks for well-being and not work motivations, that, for instance are measured in the Job Diagnostic Survey (Hackman & Oldman, 1976).
* The WEBA employs a dynamic (non-balance) approach to stress and learning, instead of static definitions like in Person-Environment models whether combined with resource models or not.
* The WEBA employs a environment model which can be compared to (but is different operationally) with Karasek's (1989), and is not a interactionist or transactional model.
* The WEBA describes stress and learning structures instead of stress and learning factors.
* The WEBA does not only estimate the level of control capacity, like a number of other socio-technological instruments (for example van Eynatten, 1985), but also tries to assess this.
* This assessment is not only matched to *the level or degree* like in the TBS (Hacker, 1983), but to *the nature* of the stress and learning structure of the work situation being investigated.
* The WEBA is not developed for the scientific experts, like the VERA (Volpert a.o., 1983), RHIA (Leitner a.o., 1987) and TBS (Hacker, 1983), but intended to be used by practitioners in the field.
* The form of the WEBA is not that of a questionnaire, but a manual, stating the information to be collected. How the actual collection of information takes place is left open.
* The most important aim of the WEBA is not scientific but practical: the creation of a frame of reference in which all participants concerned can be active in the description, assessment and redesign of work situations.
* Such an instrument does not guarantee consensus. However,it does force to well-reasoned assessments and proposals for change. Hither the importance of the use by different people.
* The basic idea, underlying the WEBA is both simple and fundamental: we assume that when someone is able to understand what stress and learning is, this person is also able to describe and assess his own or someone else's work situation in terms of stress risks. The WEBA can assist: it is intended to be an instrument that supports existing know-how, developing it instead of replacing it. This makes great demands on the instrument not only methodical but especially conceptual ones.

The further composition of this article is as follows.
In section 2 the link with well-being is clarified. What are the importance and the characteristics of the risk-approach used? How is well-being defined and how does it relate to the characteristics of the work situation?
On the basis of these theoretical ideas the description of the WEBA-instrument itself follows in section 3. It will show step by step how work situations can be described and assessed.

In section 4 the link with the design of jobs is elaborated. What is meant by structures of the division of labor? How do these come into existence and with what effects on the quality of work? A classification of improvement measures will be presented based on these ideas.
In section 5 there is a short explanation of the methodological nature of the WEBA-instrument. Aspects like the applicability, the practical use and the conditions for application are discussed here.

2. WELL-BEING DURING WORK

2.1. A conditional approach.

The incentive for the development of the instrument lies in the introduction of the provisions on well-being in the Dutch Working Environment Act in 1990. In the section of the act concerned are provisions, which the employer has to observe while organizing work, designing workplaces and establishing production and work methods, all aimed at the advancement of well-being during work.
Well-being during work has no connection with the well-being experienced by employees. It is related to the actual conditions of the contents and the organization of work. These conditions determine whether risks for well-being will arise.
According to the WEBA risks for well-being are:

1. The risks of mental overload as a result of the contents of the work. People should not become overstrained by their work.
2. The opportunities offered to people to enable them to learn and develop through working. People must be given the opportunity to develop their talents during work.

These two points are closely linked. A stress situation interferes with learning. A job with few opportunities for learning increases the chance of stress in the long run.
This means that we follow a conditional approach for well-being, analogue to the two other objectives of the Dutch Working Environment Act, safety and health. Just as the Act is meant to prevent safety and health risks from coming into being and to reduce existing risks, it is also meant to prevent risks of well-being arising and to reduce existing risks of well-being.
With respect to the occurrence of risks a difference is made between:

1. work situations which contain those risks on the basis of their characteristics; and
2. persons, who run risks through their behavior (partly determined by their motivations and skills) in those situations.

The WEBA concentrates on the first issue.
The difference stated is a precondition for the development of preventive measures in the form of improvement of the work situation. In this respect there is no difference between safety and health problems on the one hand and the issues of well-being on the other hand. See the figure below:

Work		**Person**		**Effect**
safety risks	+	safety behavior	=	accidents
health risks	+	health behavior	=	illness
stress risks	+	coping behavior	=	stress
opportunities for learning	+	learning behavior	=	skills

Fig. 2 The risk approach of safety, health and well-being

Accidents and illness are partly the result of the safety and health behavior of people. Nonetheless we can state with regard to work situations, that they may contain safety and health risks independent of the behavior of people. So when a work situation is characterized by slippery floors, shaky ladders or unprotected electricity cables we speak of safety risks, even when no accidents occur because people behave extremely cautiously.
The same reasoning can be applied to the issue of well-being. Whether people become overstrained by their work or whether they learn from their work partly depends on the way in which they deal with their work: How they cope and learn. This behavior is influenced by their personal make-up such as motivations (requirements, needs and expectations) and skills or competencies. Nonetheless we can argue whether work situations enlarge the chances of stress c.q. learning or diminish them.

2.2 Stress risks

The WEBA states that there are risks of stress when people at work are confronted with problems while the work organization does not offer the opportunity to solve these problems.
The general line of thought runs parallel to the balance model of de Sitter (1980):

"Quality of work can not be related to what with regard to contents is important and meaningful, but to the structural characteristics of the labor process, whether or not these enable the worker to repeatedly formulate that question and act accordingly. Of course someone can possibly solve an occurring "balance problem" in a way that is determined by time, location and contents. But yesterday there also was a problem and undoubtedly tomorrow another problem will arise. Therefore, behind the daily problems and their solutions a meta-problem is hidden and that problem is: "with what structural conditions must my labor process generally comply so that I can solve various numbers and kinds of problems in time and thus take part in the process of giving meaning."
Popularly said: it is not the problem during work (control-requirement), but the missing control capacity to solve the problem which gives rise to stress risks.
The balance to be considered is not that between the characteristics of work and the characteristics of people, but that between two structural characteristics of work, i.e. the configurations of control requirements and control capacities.
De Sitter supports his model with the research results of Karasek (1979).

At this point the WEBA puts into effect a change in perspective from a static to a dynamic model (Christis, 1988b). The conformity between the characteristics of work and the characteristics of people (the "Person-Environment fit") is not a static, predetermined state. The tuning in does not precede the act of work, but has to be established under continuously changing conditions by different persons in and through the act of working. Compare this point of view with the principle of ergonomics: ergonomic sound chairs are chairs which people can adjust to their individual measurements, conditions and circumstances under which they work.
What are the further implications of these two structural characteristics of work organization and work contents and how does the WEBA investigate the relationship between them?

A control requirement is a problem which necessitates controlled action. The cause can spring from four sources:

(1) The structure of the division of labor leading to a configuration of workplaces;
(2) The structure of the employment relationship or the way of recruitment, payment, training and promotion (a control requirement can for example be an uncertain employment contract or a meager career perspective);
(3) The interaction relationship between these two (e.g. discriminating work relations);
(4) The other spheres of life (e.g. shift work, working mothers)

Schematically:

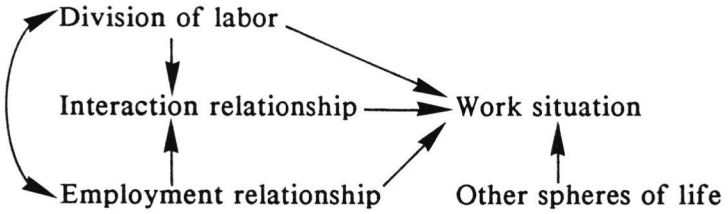

Fig. 3 Four sources of control requirements

The WEBA confines itself to the first source, the control requirements arising from the structure of the division of labor and the problems which can be solved by changes. The most important reason for this restriction is, in the first place, that the Dutch Working Environment Act concentrates on these aspects and in the second place that it does not seem sensible to integrate all sources within the same instrument. The nature of the issues at hand and the nature of the improvement measures are a different matter.

Control capacity is the configuration of possibilities which are offered by the job to accommodate the control requirements. Distinction is made between two control strategies. Internal control capacity or autonomy refers to people having at their disposal the possibility working in another way, i.e. by choosing at a different speed, another method or a different sequence. When people do not have sufficient autonomy at their disposal to accommodate the control requirements they might have the opportunity to consult someone in their environment: this is called external control capacity. Someone else is asked to help achieve the demanded input or the input that caused the control requirement is modified with the help of another.
The complete figure looks as follows:

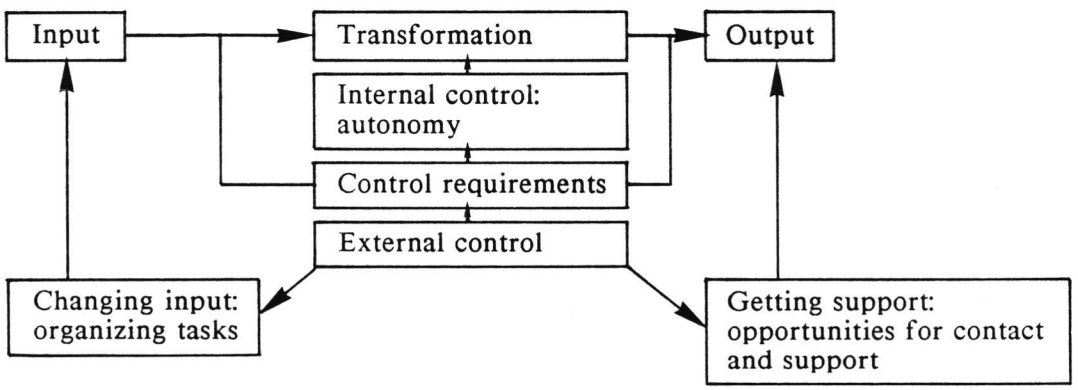

Fig. 4 Internal and external control

The three groups of control capacity which the WEBA investigates are as follows:

* Autonomy or the possibility of solving problems independently during work;
* The opportunities for contact and support or the possibility offered during work to call in someone's help;
* The organizing tasks or the possibilities of solving problems externally. This type of control can take the form of functional contact with the chief or with other departments, the periodical discussion of problems in one's own department, and discussions in task-groups (the joint planning and dividing of work).

Control problems are defined as disturbances which occur during work and which require control action. They are, so to speak, factors of hindrance. Whether these problems can be solved, depends on the presence of sufficient control capacity.
One can compare this to the difference which Frese (1987) makes between complexity, complicatedness and possibilities for control. Complicatedness then corresponds to the concept of control problems.
Just like Frese's design rule ours' reads:
"Increase complexity (control requirements) and diminish control problems".
However, work without control problems does not exist. Hence a double strategy: reduce control problems whenever possible and if there are no more possibilities, provide control opportunities.

In the Dutch Working Environment Act special attention is paid to the issue of short-cycled work. Generally speaking this work coincides with extremely low control capacity. In the law is also mentioned the provision of information (at the workplace level, the department level and the enterprise level). Good feed-back of information is needed to utilize control capacity.

2.3 The opportunities for learning and development

The WEBA lists the opportunities for learning and development that the contents of work offers. Just as with the control problems the degree and way in which these opportunities are used depends on the skills and motivations of the people concerned.
Learning in a work situation can be related to the following three groups of skills:

* occupational skills
* organizing skills
* communicative skills

Opportunities for learning and development depend on the degree to which (occupational, organizing en communicative) activities needing these qualifications are present in the job.
Occupational skills can be obtained sooner when the job consists of a logical coherent entity of preparatory, executive and supportive tasks. This is called an (occupationally) complete job. When some of the tasks are incomplete or missing the opportunities for learning become less (c.f. sequential c.q. cyclic completeness, Hacker 1983).The acquisition of occupational skills is facilitated when the job does not only consist of simple tasks but also of difficult ones (c.f. Volpert, 1983 and Hacker, 1983, hierarchical completeness). Autonomy with regard to the method of working also increases the chances for occupational learning.
Organizing skills can be acquired sooner when the job contains organizing tasks (external control capacity) (c.f. Volpert, 1983; de Sitter, 1981).
Communicative skills can be acquired more easily when the job offers the possibilities of contact and support (c.f. Alioth, 1980).
To summarize, de opportunities for learning depend on:

* The (occupational) completeness of the job;
* The presence of both simple and difficult tasks;
* The presence of possibilities for internal and external control;
* The presence of sufficient opportunities for contact.

For all kinds of skills it can be argued that the information necessary for the process of learning must satisfy demands of reliability and availability. With regard to short cycled work, which is especially mentioned in the Dutch Working Environment Act, it can be argued that generally speaking this presents few possibilities for learning.

2.4. The WEBA conditions

To summarize we state that the risks for well-being are related to seven conditions for well-being.
In short we review these conditions and their relationship to stress and learning:

1. The occupational completeness of the job.
   A job is occupationally complete if it consists of a logical coherent unity of preparatory, executive and supportive tasks. A complete job contains opportunities for learning because the work is prepared and carried out independently. This is also an important prerequisite for the building in of control capacity.

2. Organizing tasks

   Organizing tasks are related to **decisions** about work. The worker handles his affairs or solves problems externally, i.e. in cooperation or communication with others. When the worker has effective organizing tasks at his disposal (functional contacts, periodic discussion on work, or meetings in a task group) risks for stress are reduced.

   Moreover these tasks promote the possibility of developing organizational skills.

3. Short cycled tasks

   Generally speaking short cycled tasks have a very small control capacity. Risks for stress can arise. Moreover one cannot learn much from repetitive work.

4. Cognitive complexity of the job

   Work is difficult if one has to frequently consider how it should be executed. When work only consists of simple tasks the opportunities for learning are restricted. On the other hand, when work only consists of difficult tasks, the risk of stress is increased. There has to be a balanced distribution of simple and difficult tasks.

5. Autonomy in the job

   Autonomy is related to **decisions** about work. Autonomy means in the first place that one can solve one's own problems. The execution of work can be adapted to changing demands, needs and circumstances. Also autonomy, especially with regard to method, is an important prerequisite for occupational learning.

6. Opportunities for contact

   The organization of work has to offer possibilities of contacts with others during working. That can come about in different ways: by support (lend a hand to each other), by functional contacts (about work) and by means of social contacts (not directly related to work).

7. The provision of information

   Information is necessary to utilize control capacity. Without good feed back on the results of one's work one cannot learn. Moreover a lack of information at the enterprise level can promote risks of stress (alienation).

3. THE LAY OUT OF THE WEBA: STEP BY STEP

The publication (Projectgroep WEBA, 1989) contains an elaborate manual for the application of the instrument in practical situations. The manual consists of instructions which can be followed step by step.
Step 1 to 4 meant for collecting information, are explained successively: during these steps the job can be described. Next in step 5 the job is assessed in terms of risks to well-being. Step 6 gives a report.

3.1. Description of the job

STEP 1 JOB COMPOSITION
The job or task analysis is a well-known part of several sciences of work. The biggest problem is defining a criterion to distinguish the different tasks. Generally speaking three such criteria can be discerned:

1. Demarcations which are *concrete and related to the contents*, like, for instance, in the Position Analysis Questionnaire, (Mc Cormick, 1970).
   The problems with this way of working become evident when applied to "mental work" or different forms of information processing: not only are these very difficult to classify, but one also has to answer the question why "manual work" is not in essence also "mental work" c.q. the processing of information. Apart from these problems with respect to the difficulty of creating a logical coherent classification such a list would become to long and constantly run the risk of becoming outdated.

2. The *cognitive meaning* of an operation, as used for example in the VERA, (Volpert, 1983). The background of this choice is, that the entity of a operation is determined by the cognitive meaning of it for the individual. This differs from one individual to another.
   The disadvantage of this approach for the WEBA is that especially characteristics of people are estimated. Moreover specialized expert appraisal is needed to make such demarcations.

3. The *function* of operations in the process of working as is especially done in socio-technical systems theory. In socio-technology, while investigating the labor process, a difference is made between the process tasks with a different contribution to or function for the production

process: preparatory, executive, supportive and control functions. Such a classification can be applied when analyzing the composition of a job.
Theoretically speaking a job can consist of preparatory, executive supportive and organizing (control) tasks. See fig. 5

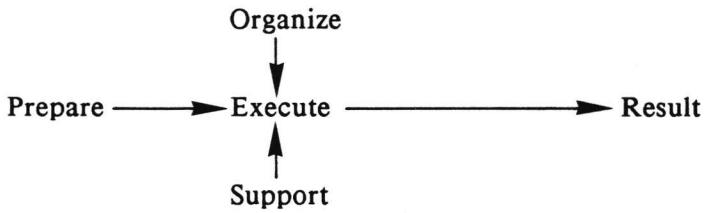

Fig. 5 Composition of a job on the basis of system functions

The advantage of this classification is that it is logical consistent and in principle can be applied to jobs of any nature. A second advantage is that this classification is closely linked to socio-technological design theory and practice.

In step 1 an analysis is made of the executing, preparatory and supportive tasks of a job. These data give information with regard to the first two WEBA conditions.
When defining the composition of a job one proceeds as follows:

* First the executive tasks are identified.
* Subsequently the accompanying preparatory and supportive tasks are established;
* And finally the organizing tasks are listed.

The best way to define the executive tasks is to consider the name of the job. For instance:

* A worker on an assembly line assembles different parts manually.
* A cash girl attends to a cash register in a shop.
* A terminal operator feeds data into files.

In the executive section five types of tasks (or operations)
can be discerned theoretically:

* INPUT	material is coming in;
* TRANSFORMATION	something is done to it
* CONTROL	is it done properly
* CORRECTION	material is adjusted
* OUTPUT	material is going out

The preparatory tasks are the tasks which have to be completed before one can start to execute the actual work.
The preparatory tasks can be related to the following subjects;

* the material	the supply and examination of the materials or the pretreatment of material.
* the means	the supply, examination and/or the tuning up of tools and/or machines.
* work method	the definition of the ways of execution.
* work sequence	the definition of the execution sequence

Supportive tasks are tasks which make sure that the work is executed without interruption.
They can be related to the following subjects:

* quality control
* maintenance of tools and machines
* administration
* surveillance of pass-through time
* lay-out of workplace
* initial training and support of colleagues.

Organizing tasks are related to co-operation or communication with others.
They are the tasks, which control the preparatory, executive and supportive process (see fig. 3).
They can take three forms:

* functional contacts: when something has to be organized, others are contacted;
* meetings: periodical meetings to discuss problems;
* discussions in task groups: the planning and division of work by a group of colleagues.

STEP 2 POINTS OF VIEW/ASPECTS

After the first step we know the tasks related to a job. In the second step it is established how the individual tasks score on the five other WEBA conditions, i.e. work cycle time, cognitive complexity, autonomy, opportunities for contact and provision of information. After all, these scores can differ for each task.

When selecting tasks for the assessment of these five one has to restrict oneself to the most important ones. Organizing tasks do not have to be described in these aspects. After all, they never just consist of simple things, they imply contacts with others, they are concerned with more then just autonomy in the work (they actually control the work), they never are short cycled and generally have sufficient sources of information.
Every aspect is scored according to three levels. The reason for this is a very practical one: a "+" indicates a favorable position; a "-" a bad position; an a "0" an intermediate position.

The work cycle time

The cycle time of a task is the time the task takes before the operation is repeated on the following object.
Cycle time can take two scores:
"+" = not short cycled
The cycle time is less than 1 1/2 minute.
"-" = short cycled
The cycle time is shorter than or equal to 1 1/2 minute

Cognitive complexity

The scoring of the level of cognitive complexity can take three values:
"+" = Difficult
One has to think first before executing the task.
"0" = Less difficult
A task is less difficult when it is either difficult or simple (see the explanation of "simple")
"-" = Simple
A task is simple when it can be executed as a routine action.

The autonomy

Autonomy is the freedom which people have while preparing, executing or supporting their work. The WEBA differentiates between the aspects of speed, method, sequence, workplace and working environment.
For each of these five a three point scale is valid:
"+" = Large
The worker himself can choose or control the speed, c.q. the method,c.q. the sequence , c.q. the workplace and the working environment.
"0" = Restricted

In principle the possibilities to control or to choose are present, but they are restricted (e.g. speed according to rigid norms or method according to exact instructions).
"-" = None
No choices can be made (e.g. the speed is compulsory or the technology determines the method).

The opportunities for contact
Opportunities for contact are classified into functional contacts for support and social communication.
Functional contacts refer to organizing tasks: the control of problems during work. This is sometimes referred to as vertical co-operation.
Contacts for support give the possibility of helping one another. Sometimes this is referred to as horizontal co-operation.
Social communication refers to contacts that are not immediately related to work.
All three kind of contacts are scored on a three point scale:
"+" = Large
Functional contacts are an integral part of the task resp. one can always support one another, resp. one works in close relationship.
"0" = Restricted
In principle the possibilities are present, they are however restricted (e.g. support is restricted as the work is machine-bound or by undermanning: social communication is restricted due to noise).
"-" = None
Contacts are not possible or do not exist.

The provision of information
The WEBA differentiates between the provision of information on the task level and the provision of information on the level of the department or the enterprise.
For both categories the following scores are used:
"+" = High
The information needed is available and useful, i.e. it is on time, complete and reliable.
"0" = Moderate
Information is available, however it is not useful due to its unreliability, and/or incompleteness.
"-" = Low
Information is not available

STEP 3 THE JOB MATRIX

The data from step 1 and step 2 are represented in a so-called job matrix. The different relevant tasks are recorded vertically. The scores on the aspects are noted horizontally.

This arrangement has three advantages:

In the first place a picture of the assessment of the WEBA conditions can be obtained. One reads which tasks are part of the job (condition 1 and 2) and what the work cycle time is, the degree of cognitive complexity, the degree of autonomy, the opportunities for contact and the quality of the provision of information.

In the second place by reading horizontally it can be ascertained if certain conditions strengthen each other. For example: when a task has no autonomy with respect to speed en no contacts for support, then these effects emphasize each other.

Thirdly by also reading horizontally the bottle necks of the job can be traced. This can give indications for taking measures.

STEP 4 THE LISTING OF CONTROL PROBLEMS

In connection with possible risks of stress it is essential to investigate the balance between control capacity and control requirements. The WEBA however does not investigate control requirements. This would be too complicated due to the partly latent character of the many variations in production processes. To trace discrepancies WEBA lists control problems. This includes problems and disturbances during work. This listing is important because later, when assessing the control capacity (step 5), it is necessary to distinguish between problems that can be solved and problems that cannot be solved. Only problems that cannot be solved give rise to stress risks. Problems that can be solved even provide opportunities for learning.

The WEBA uses a checklist for this purpose. The list is based on six sources derived from the structure of the division of labor (see fig. 3). Schematically these six sources are related as follows:

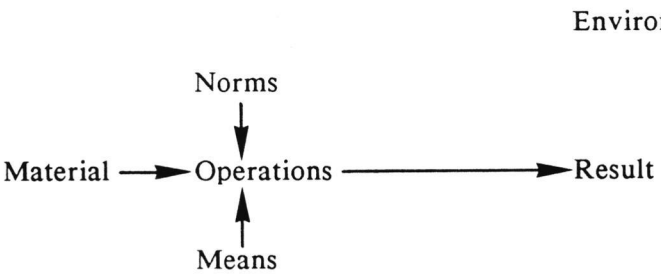

Fig. 6 Sources of control problems.

Indicated briefly:

Norms

- What: the production specifications, which describe the output;
- How: the process specifications, which outline the way a product should be manufactured;
- How much: the production norms, which relate to how much should be done in a certain period of time.

Material

Control problems can arise because material arrives too late, is of poor quality or is not available in sufficient quantities. Material can, so to speak, take on three forms: material, information or people (clients).

Means

Control problems can arise because means (tools, machines, information, people) arrive too late, are of insufficient quality, are of insufficient quantity, do not function properly or cause delays.

Operations

Can operations be corrected? Do they cause overload? Are they too difficult?

Result

Does one get information on the results of the work? Does it come on time? Is it complete?

Environment

Does the physical environment cause hindrance? Changes in the working conditions should be adapted as well as possible by autonomy in the working environment.

3.2. The assessment of the job

STEP 5 THE WEBA QUESTIONS

With the aid of the job matrix and the list of control problems seven WEBA questions can be answered. These questions read, conform the seven WEBA conditions, as follows:

1. Is the job a complete job?
2. Does the job contain sufficient organizing tasks?
3. Does the job contain sufficient non short cycled tasks?
4. Does the job have a balanced distribution of easy and difficult tasks?
5. Does the job contain sufficient autonomy?
6. Does the job contain sufficient opportunities for contacts?
7. Is sufficient information provided?

For any question three values are possible: sufficient, restricted, insufficient. The general interpretation to be given to these values is:

* Sufficient: no improvements are necessary;
* Restricted: there is room for improvements or further investigation is necessary.
* Insufficient: this condition is a bottle neck: measures are imperative.

The instrument contains guidelines and instructions for answering any of these questions.
The guidelines are based on the analysis of risks of stress and the opportunities for learning, as they can be the result of the contents and nature of each WEBA condition.

3.3 Reporting

STEP 6 THE WEBA JOB ASSESSMENT PROFILE

Next the results of the preceding WEBA analysis must be reported. The answers must be discussed, to make it possible to state priorities and consider measures.
The answers to the seven questions can be presented in a so-called WEBA job assessment profile.
The total report consists of:

1 An argued reply to the WEBA questions;
2 The WEBA job assessment profile.

Argumentation is derived from the effect of the risks of stress and the opportunities for learning in the work situation.

4. THE RELATIONSHIP WITH (RE)DESIGNING JOBS

The conclusion of the assessment of a job can be that measures assuring an improvement of the quality of work are advisable or necessary.
In conjunction with the WEBA instrument a classification of WEBA measures has been elaborated, measures that gradually improve WEBA profiles. Conform this classification, the study at hand (Projectgroep WEBA, 1989) has listed different measures for 14 kinds of jobs[1] that are of regular occurrence.

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[1]. The fourteen kinds of jobs are: secretarial work (word processing), administrative work (data entry), manual assembly work, machine operator on a moving belt, mother's help, packer, shopping assistant, process operator, middle management, cleaning work, carpentry, kitchen work, nursing, and bus driver.

In this section we shall first explain the basic ideas underlying this classification. These ideas are already roughly illustrated in figure 1: quality of the work as a result of a definite structure of the division of labor.
In the first subsection we will go more deeply into the further analysis of the different structures with just as many different diametrically opposing effects on the quality of work. Such an analysis is essential for an effective design.
Designing (or taking measures) is nothing else than the restructuring of the division of labor.
Task groups (Kuipers, 1989) offer the best WEBA conditions. A product oriented structure is then a conditio sine qua non. In the next subsection we will explain this structure and the implications for the work organization.
This explanation forms an adequate provision for the presentation of the classification of WEBA measures.

4.1 Structures of the division of labor

(Re)designing or (re)structuring the division of labor takes place in three sequential forms.
The production organization determines how work functions are linked and grouped, the production technology determines which tasks are carried out by machines and finally the work organization determines how the remaining work is distributed among the workers (Christis, 1988a).

Schematically:

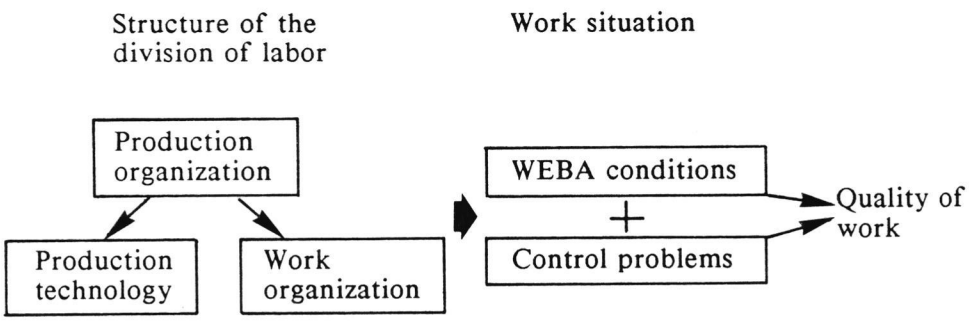

Fig. 7 Division of labor, work situation and quality of work

De Sitter (1981), Brödner (1985), the "Groep Sociotechniek" (1986) and Bolwijn et al. (1986) emphasize the importance of the correct design of the production organization, not only for the quality of work, but also for the quality of the organization (in terms of flexibility, quality, delivery times, productivity). Because of the crucial importance of this structure variable we will examine it more carefully than the other two.

1. The production organization

The production organization determines the division of labor. This shows the way in which a product to be manufactured, is put through the production process. The production organization is the result of the specific way of grouping and linking executive, preparatory, supportive and control (organizing) production functions (Groep Sociotechniek, 1987, de Sitter, 1989). See figure 5.
Generally speaking three archetypes can be distinguished on the basis of this linking and grouping.

a. a flow oriented structure (e.g. a moving belt) executes all operations sequentially on a line. Executive functions are sequentially split, preparatory and supporting functions are concentrated and control functions are centralized.

b. an operation oriented structure (e.g. an office with a separate typing room, a separate secretariat etc.) groups all identical operations. Executive functions are parallel, preparatory functions and supportive functions are concentrated and control functions centralized.

c. a product oriented structure (e.g. autonomous work units) groups all operations which belong to one group of orders. Executive functions are integrated, preparatory and supportive functions are deconcentrated and control functions decentralized.

WEBA conditions are to a large extend determined by the production organization. The functional dependency between workplaces and the conditions for co-operation under which people work are the result (see Susman, 1976; Alioth, 1980).

The most outstanding conditions are offered by a production organization of the product oriented type.
Product oriented structures schematically look as follows:

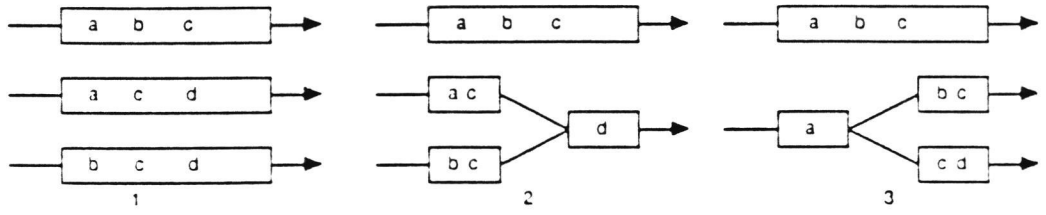

Fig. 8 Examples of product oriented structures

The product oriented character is revealed in the streamlining of product or order families. The different block elements are characterized by maximal internal cohesion and minimal external cohesion.
WEBA conditions are optimized by creating whole task groups in the block elements (see section 4.2). For this an adequate production technology (faze 2) must be implemented and task groups must actually be formed in the work organization (faze 3).

2. The production technology (technical division of labor)

This also concerns a form of division of labor. New computer technologies confirm that by the nature and level of technology choices can be made to distribute labor in different ways between men and machines. Modern free programmable technologies offer the opportunity to support flexible production organizations of the product oriented type instrumentally. For example CNC-machines, Automated Guided Vehicles or logistic trigger systems on the basis of pull principles.

3. The work organization (occupational and hierarchical division of labor)

The work organization determines how different work functions are clustered into specific jobs. On the one hand this influences the extent to which executive, preparatory and supportive tasks are clustered to (occupationally) complete jobs, on the other hand the extent to which organizing tasks (or external control capacity) are integrated in the job.

4.2. Classification of WEBA measures

The WEBA distinguishes three types of measures:

* adaptive measures
* reformative measures
* innovative measures

In this classification reference is made to the elements of figure 6.

Adaptive measures are directed towards the elimination of control problems by adapting the control requirements. Control capacity and aspects of completeness are not considered. (see figure 6).

So adaptive measures concentrate on the sources of control problems (norms, material, means, operations, result and environment). By adaptation of the control requirements the equilibrium between control capacity and control requirements will sooner be assessed as being balanced.

Examples of adaptive measures are the clarification of norms, the improvement of material, the feed back of information in time etc.

At first sight risks of stress are lessened. However it is only a question of a limited adaptation of the work situation. Undoubtedly new disturbances and various problems will arise, which cannot be solved by the unadapted control capacity. The only solution for this problem is the implementation of structural (i.e. affecting the structure of the division of labor) measures. The most radical measures (innovative measures) will be discussed below. An in-between category are reformative measures, which intervene in the work organization.

Reformative measures are directed towards the completeness of jobs by integrating preparatory, executive and supportive measures (occupational division of labor) and/or the integration of control capacity (hierarchical division of labor). The work organization is reshuffled. The production organization remains the same. Examples of reformative measures are the classical redesign of jobs (Davis and Taylor, 1972; den Hertog, 1975; van Assen and den Hertog, 1980): job rotation, job enlargement, job enrichment and task groups. The latter is only possible when the production organization already shows the characteristics of the product oriented production organization.

Innovative measures are the most effective WEBA measures. They are directed towards product oriented production organizations with an adequate technology and the construction of task groups What does the WEBA mean by task groups and why do they offer optimal WEBA conditions? Task groups have the following three central characteristics (Van Amelsvoort, 1989):

1. The occupational domain of the task group covers a complete part of the process. Executive, preparatory and supportive tasks are linked within the task group to a coherent unity.
2. The control capacity of the task group is at a maximum. Members of the group have to be able to arrange production processes independently (the distribution of work, priorities, routing, planning of capacity etc.) and adjust them if necessary (by changing methods or process arrangements).
3. The functional interdependency within the group is such that the group must function as a team with co-operative decision processes.

Task groups offer the best conditions for a good quality of labor in terms of risks for well-being. The WEBA conditions are optimized.

The group indeed covers a complete part of the process from a occupational, organizing and social point of view. In addition the control capacity is balanced as much as possible with the control requirements. By simplifying the production organization the control requirements have been reduced and also the necessary control capacity is allocated to the group.

Production organizations with a flow- or operation oriented structure can, via a strategy of parallelization and segmentation respectively via so called group technology be transformed into product oriented structures (Groep Sociotechniek, 1986):

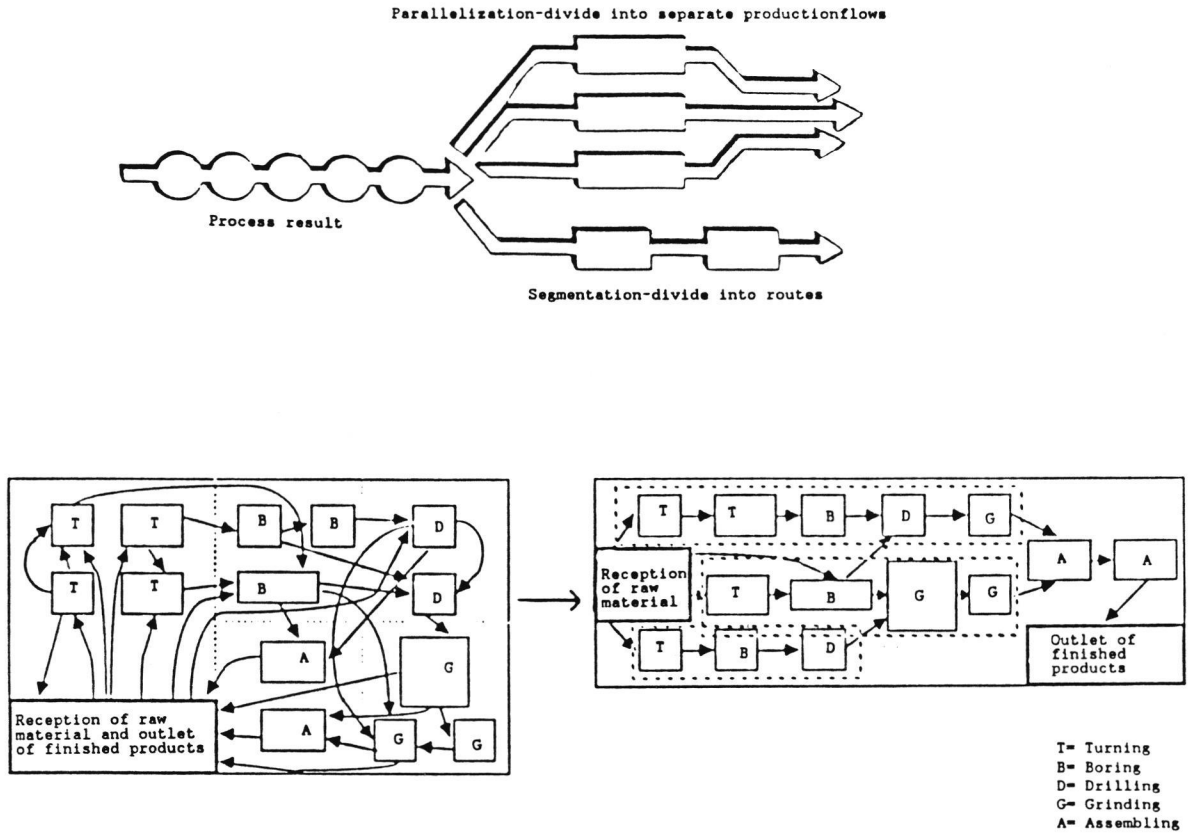

Fig. 9 Transformation of the flow- respectively operation oriented structure to product oriented structure

The project team WEBA (1989) has made an inventory of examples of innovative measures or situations for all fourteen kinds of work (note 1) which approximate the definite design in the practice of Dutch enterprises.

The implementation of an innovative measure is no sinecure. One has to consider many problems and conditions (Huygen, 1989). For example the pressure on power- and responsibility positions, the resistance to change processes as a result of traditional structures and the repercussions in the field of terms of employment, payment, training etc. (accompanying measures).
Furthermore in the Netherlands it is specifically de Sitter who pointed out the objections to a in his terminology redesign of production organizations by focussing only on aspects. The catchword of modern socio-technology is indeed that organizations can be assessed on aspects (e.g. the quality

of work), however, the redesign with a innovative character can only be a success if all relevant aspects of the enterprise (also quality, logistics, automatization, flexibility etc.) can be taken into account integrally.

The WEBA classification takes these problems partly into account by presenting less far reaching adaptive and reformative measures. These different measures can be applied in many cases in this sequence both short term and long term.

5. THE NATURE OF THE INSTRUMENT

The WEBA is designed as an instrument which must be useful and profitable to the enterprise in daily practice. To achieve this theoretical and methodological choices had to be made. The theoretical choices have been dealt with in section 2. In this section we will briefly deal with the methodological choices and their consequences in practice.
The instrument does not consist of an expert system with which the quality of work can be measured independently of interpretations. After all it is interesting to see if such a system is possible. With regard to the aims (the application of enterprises themselves) such a system is certainly not advisable. An expert system can only be used by experts.
A reversed philosophy forms the basis of the WEBA. The instrument takes into consideration all participants who are committed to a social policy as experts, each in his own way, in that field. The composition of the WEBA is such, that all participants in the assessment and improvement process are able to use it. The instrument is a kind of manual helping to scrutinizing work situations.
When using the instrument the user should:

* have an understanding of the nature of stress and learning and the conditions in which risks and chances can increase or decrease.
* have an understanding of the nature of the work situation to be described and assessed.

With the aid of this understanding and the instructions it should be possible, after initial self-training or with the aid of others, to establish the quality of one's own work or that of somebody else. By doing so the expertise is not invested in the instrument but is mobilized by the users with every application.

The advantages of the instrument are simply that everybody proceeds in the same way when applying the instrument. That facilitates consensus and makes it more probable. It is however

not a necessary result nor the most important goal of the instrument. The goal could be seen as the possibility to present different argumentations. The instrument forces argumentation and only when one knows precisely where opinions differ, can agreements for improvements be reached. Of course in this stage one will often have to compromise.

6. IN CONCLUSION

The WEBA is a new instrument with a modern character for the assessment of the quality of work. This character originates from the specific demands of the initiator of the research (the Dutch Ministry for Social Affairs and Employment) to construct an instrument that takes as point of reference the state of the art in relevant sciences. In a number of ways the instrument advances this character:

The instrument uses actual insights in the nature of and the conditions under which stress and learning originate during work. Also a link is sought with the most developed design theories. And in conclusion the WEBA coincides with the implementation goals of the Dutch Working Environment Act which becomes operational in 1990.

Useful and practical instruments form a conditio sine qua non for the self-activation of enterprises in the field of social labor policy.

By means of these explicit choices the authors of the WEBA hope to have been able to fill gaps in the field of the improvement of the quality of labor in the practice of enterprises and research. The state of the art in the sciences of labor is certainly not a static concept, especially from an international point of view. Readers are cordially invited to comment on the WEBA and to actualize it.

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