

Razvoj funkcij kakovosti s poudarkom na "hiši kakovosti"

Quality Functions Deployment with Emphasis on the "House of Quality"

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V procesu celovitega obvladovanja kakovosti v podjetju ima posebno mesto razvoj funkcij kakovosti (QFD), ki omogoča oblikovanje razvojnega kroga izdelka. Zgradbo ponazorimo v obliki hiše - od tod tudi ime "hiša kakovosti". Po definiciji je QFD oz. hiša kakovosti metoda, s katero prevedemo zahteve kupca v tehnične zahteve procesa načrtovanja izdelka.

Temeljna naloga hiše kakovosti je iskanje relacij, ki so lahko močne, srednje ali šibke, med zahtevami kupca in tehničnimi zahtevami podjetja. Omogoča pa tudi definiranje povezav med tehničnimi zahtevami, ki pa so lahko močno pozitivne, pozitivne, negativne oz. močno negativne. Pomemben del hiše kakovosti je tudi analiza konkurenčnosti, s katero ugotavljamo, kako naš izdelek izpolnjuje zahteve kupca na tržišču.

V prispevku so pokazani koraki nastajanja hiše kakovosti s prikazom praktičnega primera.

Ključne besede: celovito obvladovanje kakovosti, hiša kakovosti, zahteve kupcev, zahteve tehnične

Quality functions deployment (QFD) has an important state in total quality management in an enterprise. It is a process which enables the design of the product's development cycle. This is presented as a house - from which we derive the expression "house of quality". House of quality is a method which translates customer requirements into the design requirements of product.

Finding the relations between customer requirements and design requirements are the basic task of the house of quality. Relations can be strong, medium or weak. A house of quality also enables the determination of correlations between design requirements. The correlation can be strongly positive, positive, negative or strongly negative. The customer competitive survey is also an important part of the house of quality: it establishes how our product fulfills customer requirements on the market.

The paper presents steps for design of the house of quality through a practical example.

Keywords: total quality management, house of quality, customer requirements, design requirements

0 UVOD

Podjetja ne posvečajo dovolj pozornosti izpoljevanju želja in potreb kupcev, vendar ugotavlja, da je prav doseganje teh tistih parameter, ki loči uspešna podjetja od neuspešnih. Med orodji, ki pomagajo povezati potrebe in zahteve kupca z možnostmi podjetij, se je v svetu pojavila metodologija razvoja funkcij kakovosti QFD - v praksi znana pod imenom "hiša kakovosti" [1]. Metodologija je bila razvita leta 1972 v Mitsubishijevi ladjedelnici v japonskem mestu Kobe in omogoča oblikovanje razvojnega kroga izdelka. Njena uporaba se je hitro razširila tudi na druga japonska podjetja. K razvoju in popularnosti je veliko prispevala predvsem tovarna Toyota [2]. V Evropi metodologija še ni našla ustreznega mesta oziroma uporabnosti. V ZDA se je pojavila v 80. letih, predvsem v povezavi s podjetjem Xerox.

Hiša kakovosti je metoda, pri kateri je z uporabo matrik pokazana povezava med zahtevami in željami kupca ter tehničnimi možnostmi podjetja. Je orodje, ki tako v procesu načrtovanja izdelka, kakor tudi pri njegovem kasnejšem izpopolnjevanju, prevede zahteve in potrebe kupca v določene tehnične rešitve - zahteve izdelka. Izdelava je skupinsko delo in jo lahko uporabimo kot sredstvo za komunikacijo sodelujočih v skupini. Njen namen je vključevanje kupca v razvoj izdelka ter njegovo kasnejše stalno izboljševanje. Goetsch in Davis [3] sta postavila definicijo:

0 INTRODUCTION

Companies do not pay enough attention to the fulfillment of the wishes and requirements of the customers; yet they agree that meeting these requirements is the key factor that distinguishes successful companies from less successful ones. One of the tools which makes it possible to connect the customer's requirements with the capabilities of the companies is known as quality function deployment (QFD) methodology, in practical use known as the "house of quality" [1]. This methodology was developed in 1972 in the Mitsubishi shipyard in Kobe, Japan. It enables design of the development cycle of the product. Its use quickly increasing also to other Japanese companies. The Toyota company had the main role in its development and spread of popularity [2]. The methodology appeared in the USA in the eighties (with the main involvement of the Xerox company), yet it has still not found its place and use in Europe.

The house of quality is a method which (by use of matrices) shows connections between the requirements and wishes of the customer and the technical capabilities of the company. It is a tool which during the product design and its later refinements transforms the customer's requirements into specific technical solutions - requirements of the product. Construction is a team work and it can be used for team members intercommunication. Its purpose is to include the customer into the product development and into its later permanent improvements. Goetsch and Davis [3] wrote the definition:

Hiša kakovosti je praktično orodje načrtovanja procesa izdelka, tako da ta izpolnjuje kupčeve zahteve. Hiša kakovosti prevede tisto, kar hoče kupec, v tisto, kar podjetje izdeluje. Daje prednost kupčevim potrebam, išče inovativne postopke za njihovo izpolnitev ter izboljšuje proces do največje uspešnosti.

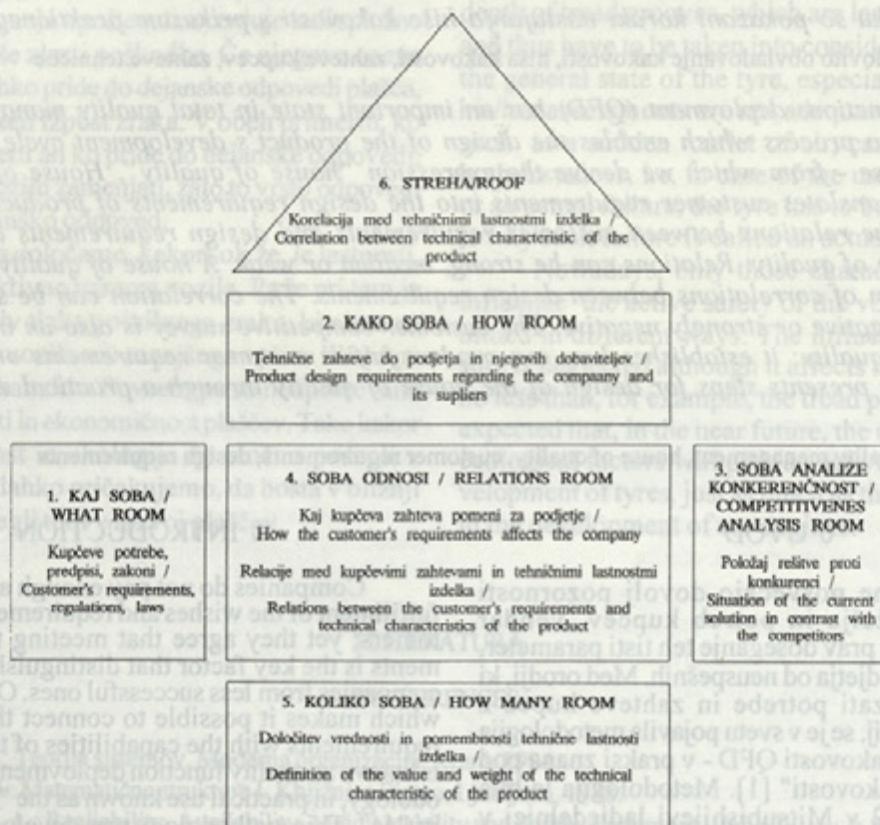
1. NAČRTOVANJE HIŠE KAKOVOSTI

QFD - razvoj funkcij kakovosti imenujemo hiša kakovosti zaradi njene značilne oblike. Sestavljena je iz šestih matrik, imenovanih sobe [2]. Struktura hiše kakovosti je prikazana na sliki 1.

The house of quality is a practical tool for designing the production process so that it fulfills the customer's requirements. The house of quality transforms the customer's requirements into company's products. It enables us to define the priority of customer's requirements, it seeks innovative methods for their solutions and it improves the process to the maximum effectiveness.

I DESIGNING THE HOUSE OF QUALITY

Quality functions deployment (QFD) is called the house of quality because of its characteristic form. It is composed of six matrices, known as rooms [2]. The house of quality structure is shown in figure 1.



Sl. 1. Struktura hiše kakovosti
Fig. 1. The house of quality structure

V hiši kakovosti imamo šest sob:

1. soba: soba KA.J

Predstavlja zahteve in potrebe kupca.
Naštete so primarne, sekundarne in tercialne zahteve.
Vanjo pa so lahko vključeni tudi standardi, predpisi in zakoni.

2. soba; soba KAKO

Predstavlja tehnične zahteve do podjetja in njegovih dobaviteljev, s katerimi bodo izpolnjene zahteve kupca. Odgovori na vprašanja, kako se potrebe kupca izražajo s tehničnimi zahtevami izdelka.

There are six rooms in the house of quality:

Room 1:WHAT room

This represents the requirements and needs of the customer: primary, secondary and tertiary requirements. It is also possible to include standards, regulations and laws.

Room 2: HOW room

This represents product design requirements regarding the company and its suppliers, which will enable it to fulfill the customer's requirements. In this way it is possible to get an answer to the question, of how the requirements of the customer are represented by the product design requirements.

3. soba: soba ANALIZE KONKURENČNOSTI

Prikazuje trenuten položaj rešitve izdelka v primerjavi s konkurenco in mesta možnih izboljšav.

4. soba: soba ODNOSI

To je jedro hiše kakovosti. Vsebuje matriko odnosov - relacij med sobo KAJ in sobo KAKO (odnosi med zahtevami in potrebami kupca ter tehničnimi lastnostmi izdelka).

5. soba: soba KOLIKO

Zapisane so ugotovitve, katere tehnične zahteve izdelka oziroma procesa so najpomembnejše za dosegajoči zahteve kupca.

6. soba: STREHA hiše kakovosti

Streha hiše kakovosti je korelacijska matrika med različnimi tehničnimi lastnostmi izdelka.

2 GRADNJA HIŠE KAKOVOSTI

Gradnja hiše kakovosti je preprosta, zahteva pa veliko truda in učinkovitega dela v skupini. Velikost hiše kakovosti je odvisna od števila zahtev kupca. Avtorji hiše kakovosti priporočajo, da s to metodo rešujemo probleme razsežnosti do 30 zahtev kupca in prav toliko tehničnih zahtev izdelka, sicer postane zapletena in nepregledna. Gradnja hiše kakovosti poteka v enajstih korakih.

1. KORAK: Izpolnitev liste želja (potreb) kupca

Gradnja se prične z zbiranjem potreb in želja kupcev na podlagi anket in metod tržnih raziskav. Dobljene podatke razvrstimo v primarne, sekundarne in terciarne. Primarni so splošni, sekundarni določajo primarne, terciarni pa primarne omogočajo.

2. KORAK: Razvrstitev kupčevih potreb glede na pomembnost

Ker se potrebe kupcev lahko med seboj dopolnjujejo ali pa izključujejo, določimo za vsako kupčev potrebo relativno pomembnost ali določimo njen faktor pomembnosti.

3. KORAK: Razvrščanje dosedanja rešitve izdelka glede na konkurenco

V tem koraku se izpolni soba ANALIZE KONKURENČNOSTI. Trenutna rešitev izdelka se po posameznih lastnostih primerja s konkurenčnimi izdelki. Podjetje, ki želi konkurenco premagati, mora ugotoviti položaj svojega izdelka na tržišču. Ta korak pomaga poiskati mogoče izboljšave izdelka. Razvrščanje se izvede na podlagi anketiranja kupcev ali z drugimi tržnimi raziskavami.

Room 3: COMPETITIVENESS ANALYSIS room

This shows the situation of the current product solution in contrast with the competitors and it also reveals the points for possible improvements.

Room 4: RELATIONS room

This is the kernel of the house of quality. It contains the relations matrix between the WHAT room and the HOW room (these are the relations between the requirements and needs of the customer and the technical characteristics of the product).

Room 5: HOW MUCH room

This contains the findings about the product design requirements and processes which are the most important for meeting the customer's needs.

Room 6: ROOF of the house of quality

The correlation matrix between various technical characteristics of the product is represented by the roof of the house of quality.

2 BUILDING THE HOUSE OF QUALITY

Building the house of quality is a simple task but it requires a lot of effort and efficient team work. The size of the house of quality depends on the number of the customer's requirements. The authors of this method recommend that it be used to solve problems in which up to 30 of the customer's requirements are taken into account and just as many product design requirements - otherwise it becomes too complicated and unclear. Eleven steps are needed to build the house of quality.

STEP 1: Fill in the customer's wishes (requirements)

Building begins by gathering the needs and wishes of the customers. Questionnaires and market research methods are used. The data obtained in this way are sorted into primary, secondary and tertiary ones. Primary data are general, secondary data define the primary ones, while the tertiary ones enable the primary ones.

STEP 2: Classification of the customer's needs according to the weight

As customer's requirements can be mutually complementary or exclusive it is necessary to define the relative weight (weight factor) for every customer's need.

STEP 3: Ranging the current solution of the product in comparison with the competitors

The COMPETITIVE ANALYSIS room is defined in this step. The current solution of the product should be (regarding individual characteristics) step-wise compared with the competing products. A company which wants to beat the competitors should find out the market status of its product. This step helps one to find out possible improvements for the product. Ranging is based upon the results of a questionnaire submitted to the customers or by other types of market research.

4. KORAK: Izpolnitev sobe KAKO

Določimo tehnične zahteve izdelka - KAKO, ki omogočajo uresničitev kupčevih potreb - KAJ. Poleg zahtev izdelka dodamo še označbo (puščico), ki pove, ali je za izdelek primernejša nižja ali višja vrednost tehnične zahteve izdelka, ki vključuje oblikovne, konstrukcijske in proizvodne zahteve ter tehnološke in kakovostne karakteristike. Pri določanju tehničnih zahtev si pomagamo z vprašanji:

- Kakšna sta funkcija in namen izdelka?
- Kakšen je videz izdelka?
- Kakšna je cena izdelka?
- Kako se bo izdelek prodajal?

5. KORAK: Izpolnitev matrike odnosov v sobi ODNOSI

Izpolnimo osrednji del hiše kakovosti. V matriki odnosov povemo, v kakšni meri so tehnične lastnosti izdelka - KAKO povezane s potrebami kupcev - KAJ. Pri tem so mogoče štiri vrste povezav:

- - označuje močno povezavo, ki je utežena s številom 9,
- - označuje srednjo povezavo, ki je utežena s številom 3,
- Δ - označuje šibko povezavo, ki je utežena s številom 1,
- prazna celica, ki pove da povezave ni, utežena z 0.

Izkušnje iz prakse kažejo, da je za uspešno reševanje problemov primerna izpolnitev manj kot polovice celic matrike.

Po izpolnjevanju matrike sledi preverjanje. Preveriti moramo, ali ima vsaka potreba kupca povezavo z vsaj eno tehnično lastnostjo izdelka. Če povezave ni, potem moramo ugotoviti novo tehnično lastnost izdelka, ki bo izpolnjevala kupčevu potrebo. Sama prazna mesta v stolpcu matrike (tehnične lastnosti izdelka) povedo, da je lastnost za izdelek nepomembna.

6. KORAK: Določitev dejanskih vrednosti v sobi KAKO

V spodnjo sobo hiše kakovosti vpišemo dejanske vrednosti tehničnih lastnosti za trenutno rešitev izdelka ter za konkurenčne izdelke.

7. KORAK: Določitev absolutne in relativne tehnične pomembnosti

Za vsako tehnično lastnost izdelka se določi njena absolutna in relativna tehnična pomembnost. Absolutno tehnično pomembnost se določi po enačbi:

STEP 4: Fill in the HOW room

In this step the product design requirements - HOW - are being defined, thus enabling fulfillment of the customer's needs - WHAT. Next to the requirements of the product an arrow is added to indicate whether a lower or higher level of technical requirement is suitable for the product. This includes requirements regarding form, design and production, as well as technological and quality characteristics. When defining product design requirements the following questions might be of help:

- What are the function and purpose of the product?
- How does the product look?
- What is the price of the product?
- How will the product be sold?

STEP 5: Fill in the relation matrix in the RELATIONS room

This is the central part of the quality house. The relation matrix shows how the technical characteristics of the product (HOW) fulfill the customers' needs (WHAT). Four types of connections are possible:

- - denotes a strong connection (relative weight 9),
- - medium connection (relative weight 3),
- Δ - weak connection (relative weight 1),
- empty cell - no connection (relative weight 0).

Practical experience shows that problems can be successfully solved even if less than half of the matrix cells are filled in.

After the matrix has been filled in with the data, it should be checked to determine whether every customer's need has a connection, with at least one technical characteristic of the product. If there is no connection another technical characteristic should be found which will fulfill the customer's need. Blank spaces in a matrix column (technical characteristics of the product) indicate that the characteristic is not important for the product.

STEP 6: Defining actual values in the HOW room

Actual values of technical characteristics for the current solution of the product and for competitive products should be put into the lower room of the house of quality.

STEP 7: Defining absolute and relative technical weight

Absolute and relative technical weight is defined for every technical characteristic of the product. Absolute technical weight is defined by the equation:

1. Priprava na gradnjo hiše kakovosti
2. Gradnja hiše kakovosti.

$$ATP = \sum_{i=1}^n (VR_i \times P_i)$$

ATP	absolutna tehnična pomembnost
VR _i	vrednost relacije i-te zahteve kupca
P _i	pomembnost i-te zahteve kupca
n	število vseh zahtev kupca

ATP	absolute technical weight
VR _i	value of the relation of the i-th customer's requirement
P _i	weight of the i-th customer's requirement
n	number of the customer's requirements

8. KORAK: Določitev tehnične težavnosti

Tehnične lastnosti izdelka razvrščamo po težavnosti njihove uresničitve od 1 do 5, pri čemer je 1 najlaže in 5 najteže uresničljiva tehnična lastnost.

S koraki 6, 7 in 8 se v celoti izpolni soba KOLIKO v hiši kakovosti.

9. KORAK: Izdelava matrike povezav - STREHE hiše kakovosti

Korelacijska matrika pokaže medsebojne povezave tehničnih lastnosti izdelka. Povezave so lahko:

- # - močno negativna povezava
- X - negativna povezava
- O - pozitivna povezava
- - močno pozitivna povezava

Z matriko povezav je izpolnjena tudi streha hiše kakovosti.

10. KORAK: Določitev ciljnih vrednosti

Ciljne vrednosti tehnične lastnosti izdelka določimo glede na položaj dosedanje rešitve izdelka v primerjavi s konkurenco (soba ANALIZE KONKURENČNOSTI) in dejanskih vrednosti tehničnih lastnosti izdelka v sobi KOLIKO.

11. KORAK: Nadaljnji razvoj hiše kakovosti

Nadaljnji razvoj hiše kakovosti se izvede tako, da tehnične lastnosti izdelka - KAKO sedanje hiše kakovosti, postanejo zahteve KAJ v novi hiši kakovosti.

3 ŠIRITEV HIŠE KAKOVOSTI

Hiša kakovosti je metoda, s katero se ugotavlja povezave med funkcijami izdelave ter željami in potrebami kupcev. Če ponavljamo 11. korak gradnje hiše kakovosti [4], najprej poiščemo razmerje med tehničnimi karakteristikami in karakteristikami sestavnih delov (druga hiša kakovosti), med karakteristikami sestavnih delov in ključnimi operacijami procesov (tretja hiša kakovosti) in nazadnje še med ključnimi operacijami procesov in proizvodnimi zahtevami (četrta hiša kakovosti).

Primer takšne širitve hiše kakovosti je prikazan na sliki 2.

STEP 8: Defining technical complexity

The technical characteristics of the product are being ranged according to the complexity of their fulfillment with points from 1 to 5, where 1 corresponds to the easiest and 5 to the most difficult realizable technical characteristics.

In steps 6, 7, and 8 the HOW MUCH room is filled in with data.

STEP 9: Construction of the correlation matrix - the ROOF of the house of quality

The correlation matrix shows the mutual connections of technical characteristics of the product. Connections can be:

- # - strong negative connection
- X - negative connection
- O - positive connection
- - strong positive connection

The correlation matrix data also fill in the roof of the house of quality.

STEP 10: Definition of the target values

The target values of the technical characteristics of the product are defined regarding the position of the current solution of the product in comparison with the competitors (COMPETITORS ANALYSIS room) and actual values of the technical characteristics of the product in the HOW MUCH room.

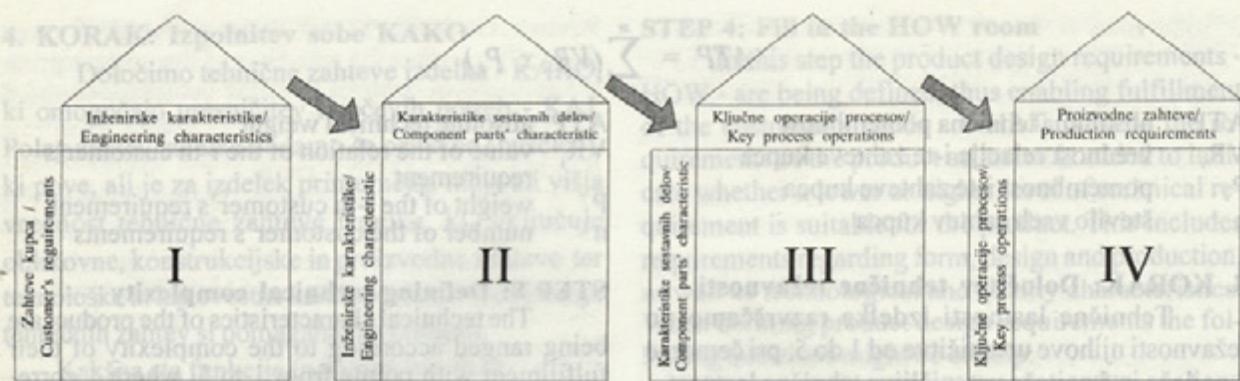
STEP 11: Further development of the house of quality

Further development of the house of quality is performed so that the technical characteristics of the product - the HOW of the current house of quality - become the WHAT requirements in the new house of quality.

3 EXTENSION OF THE HOUSE OF QUALITY

The house of quality method enables us to find out the connections between the production functions and the customer's satisfaction. If step 11 of building the house of quality is repeated [4], first the relation between engineering characteristics and component parts characteristics should be found (second house of quality), then the relation between the component parts characteristics and the key process operations (third house of quality), and finally the relation between the key process operations and production requirements (fourth house of quality).

An example of such an extension of the house of quality is shown in figure 2.



Sl. 2. Nadaljnja širitev hiše kakovosti
Fig. 2. Further extension of the house of quality

4 PREDNOSTI HIŠE KAKOVOSTI

Podjetjem prinaša hiša kakovosti številne koristi, posebej za izboljšanje konkurenčnosti in nenehno izboljševanje kakovosti. Izražajo se v:

- Osredotočenju na kupca

Vsako podjetje, ki je uvedlo celovito obvladovanje kakovosti, mora biti osredotočeno na kupca. Hiša kakovosti omogoča zbiranje vhodnih in povratnih informacij kupcev, te pa so prevedene v zbir zahtev in postanejo ciljne vrednosti, ki jih mora podjetje doseči.

- Boljšem časovnem izkoristku

Hiša kakovosti skrajša razvojni čas izdelka, saj pokaže bistvene in jasno določene kupčeve zahteve. Tako ne izgubljamo časa pri lastnostih izdelka, ki za kupca niso pomembne.

- Skupinskem delu

Hiša kakovosti je kot metoda, usmerjena na skupinsko delo. Vse odločitve so rezultat soglasja članov skupine.

- Dosledni dokumentaciji

Rezultat hiše kakovosti je tudi dokument, ki združuje podatke o procesih in prikazuje njihovo dopolnjevanje pri zadovoljevanju zahtev kupca. Dokument se s pridobivanjem novih informacij stalno spreminja. Za uspešno načrtovanje novih in izboljševanje sedanjih izdelkov moramo spremljati sprotne informacije o zahtevah kupca.

5 PRIMER GRADNJE HIŠE KAKOVOSTI ZA ELEKTROMAGNETNI DOZIRNIK

Gradnja hiše kakovosti je prikazana na primeru elektromagnetnega dozirnika [5]. Projekt gradnje hiše kakovosti sestavlja fazi:

4 ADVANTAGES OF THE HOUSE OF QUALITY

The house of quality brings many advantages to companies, especially in the improvement of competitiveness and permanent improvements of quality. The advantages are manifested as:

- Focus on the customer

Each company that has introduced total quality management should be focused on the customer. The house of quality enables the acquisition of input and feedback data from the customers, these data are later transformed into a list of customers' requirements and they become the target values to be achieved by the company.

- Better time efficiency

The house of quality reduces development time of the product, as it shows the main and clearly defined customer's needs. Therefore no time is lost on development of characteristics of the product which are not needed by the customer.

- Team work

The house of quality as a method is oriented towards team work. All decisions are made by common consent of all team members.

- Consistent documentation

One of the results of the house of quality is an exhaustive document which combines all the process data and shows how they are inter-complementary in satisfying the customer's needs. The document constantly changes when new data are obtained. For successful planning of new products and improvement of current products it is necessary to note daily information about the customer's requirements.

5 AN EXAMPLE OF BUILDING THE HOUSE OF QUALITY FOR AN ELECTROMAGNETIC DOSAGE FACILITY

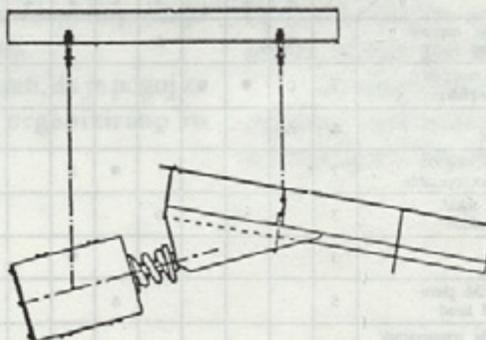
Building the house of quality is presented by the example of an electromagnetic dosage facility [5]. Building the house of quality is a two phase project:

1. Priprava na gradnjo hiše kakovosti.
2. Gradnja hiše kakovosti.

5.1 Priprava na gradnjo hiše kakovosti

Vodstvo podjetja se je odločilo za izvedbo priprave projekta gradnje hiše kakovosti v petih korakih:

1. KORAK: Oblikovanje projektne skupine v sestavi:
 - vodja razvoja, kot moderator skupine,
 - vodja službe kakovosti,
 - konstruktor,
 - tehnolog,
 - vodja prodaje.
2. KORAK: Določitev načina poročanja. Dogovorjeno je bilo, da vodja službe kakovosti poroča o poteku projekta direktorju podjetja vsakih 14 dni.
3. KORAK: Izbira izdelka. Vodstvo podjetja je odločilo, da se gradnja hiše kakovosti izvede za izdelek EMD - elektromagnetni dozirnik, katerega shema je prikazana na sliki 3.



Sl. 3. Shema EMD
Fig. 3. EMD scheme

4. KORAK: Uvodni sestanek je bil namenjen seznanitvi članov skupine z nalogami in nameni. Dogovorjeno je bilo, da se sestajajo tedensko na dveh do treh sejah. Posamezna seja ne sme trajati več kot dve uri.

5. KORAK: Usposabljanje tima. Člani tima so bili prek zunanjega svetovalca seznanjeni z metodami kreativnega iskanja idej ter z namenom in načinom gradnje hiše kakovosti.

1. Arrangements made before building the house of quality.
2. Building the house of quality.

5.1 Arrangement before building the house of quality

Company management decided that the preparation before the project of building the house of quality should be executed in five steps.

- STEP 1: Constitution of a project team:**
- head of development department (moderator of the team),
 - head of quality service,
 - designer,
 - technologist,
 - sales head.

- STEP 2: Definition of reporting.** It was agreed that the head of the quality service should report about the course of the project to the general manager of the company every two weeks.

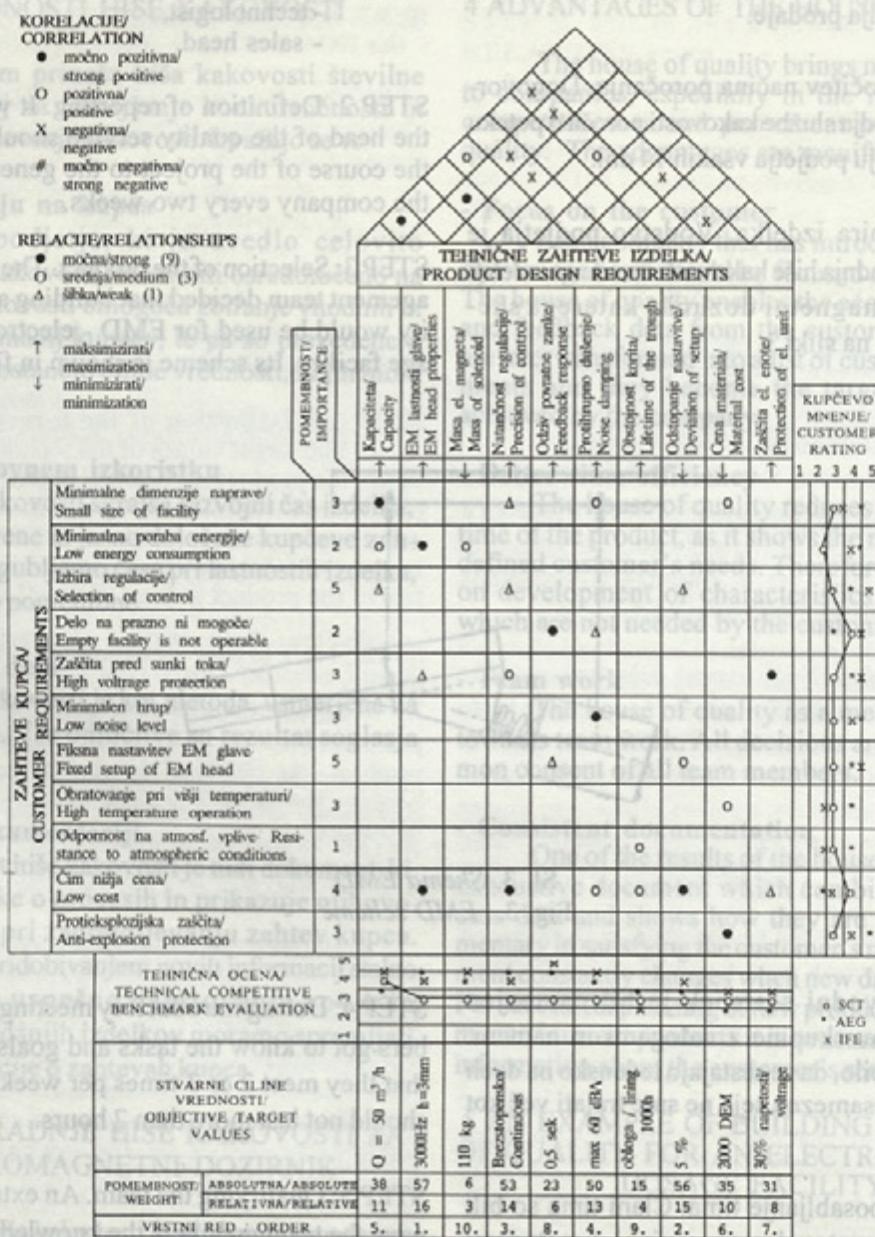
- STEP 3: Selection of the product.** The company management team decided that building a house of quality would be used for EMD - electromagnetic dosage facility. Its scheme is shown in figure 3.

- STEP 4: During introductory meeting** the team members got to know the tasks and goals. It was agreed that they meet 2 or 3 times per week. Each meeting should not last more than 2 hours.

- STEP 5: Qualifying the team.** An external counselor gave the team members the knowledge about brainstorming, as well as information on the purpose and method of building the house of quality.

5.2 Gradnja hiše kakovosti za EMD

Gradnja hiše kakovosti za izdelek EMD je potekala po korakih, ki so opisani v poglavju 3. Na prvem delovnem sestanku so člani skupine začeli graditi prvo sobo hiše kakovosti (oštreljenje sob se nanaša na sliko 1). Po krajšem uvodu moderatorja je tim z metodo kreativnega iskanja predlagal 60 različnih zahtev kupca. Z metodo primerjave parov [6] pa so se odločili za prvih 11 zahtev. V nadaljevanju so bile določene pomembnosti posamezne zahteve kupca, katerih rezultat prikazuje slika 4. Sledila je analiza konkurenčnosti (soba 3) in primerjava podjetja s konkurenčnima proizvajalcema AEG in IFE [7].



Sl. 4. Hiša kakovosti za dozirnik EM
Fig. 4. The house of quality for EMD

5.2 Building the house of quality for EMD

Building the house of quality for EMD was done in steps, as described in chapter 3. During the first meeting the team members began to build the first room of the house of quality (room numbering corresponds to figure 1). After a brief introduction by the moderator the team used brainstorming, through which 60 customer's requirements were suggested. The method of pair comparison [6] was used to select the first 11 requirements. In the continuation, the weight of individual customer requirements were determined - this result is shown in figure 4. The next step was an analysis of competitiveness (room 3) and comparison of the company with its competitors AEG and IFE [7].

Izdelane so bile: soba 2, ki podaja tehnične zahteve izdelka; soba 4, v kateri so definirali odnose med zahtevami kupca in tehničnimi zahtevami izdelka (osrednji del hiše kakovosti); in soba 5, v katero so zapisali vrednosti tehničnih lastnosti izdelka, vključno s primerjavo konkurenco. Sledilo je določanje absolutne in relativne tehnične pomembnosti ter vrstnega reda tehničnih lastnosti izdelka. Zapisane so bile še korelacije med tehničnimi lastnostmi izdelka - soba 6.

Na zadnjem sestanku je skupina določila ciljne vrednosti tehničnih lastnosti izdelka in analizirala položaj dosedanja rešitve v primerjavi s konkurenco. Rezultati analize so pokazali, kje ima podjetje prednosti pred konkurenco, kje jo je mogoče z uvedbo izboljšav doseči in kje ne.

6 SKLEP

The European

V članku je prikazana metoda gradnje hiše kakovosti kot enega najpomembnejših orodij v postopku celovitega obvladovanja kakovosti. Pokazan je praktičen primer gradnje hiše kakovosti elektromagnetnega dozirnika. Rezultati kažejo uporabnost metode hiše kakovosti za nenehno izboljševanje kakovosti izdelka in prilagajanje zahtevam, željam in potrebam kupca.

Dosedanji preizkusi so pokazali, da je pogoj za realnost hiše kakovosti dobro organizirano in ustvarjalno skupinsko delo.

Keywords: work unit, management concepts, total quality management, house of quality

The following rooms were made: room 2 which defines product design requirements, room 4 where relations between the customer's requirements and product design requirements were defined (central part of the house of quality), and room 5 where the values of the technical characteristics of the product were stated, including comparison with the competition. What followed was a definition of the absolute and relative the technical weight and sequential order of technical characteristics of the product. Finally, correlations between the technical characteristics of the product were stated - room 6.

During its last meeting the team defined the target values of technical characteristics of the product and analyzed the situation of the current solution in comparison with the competition. The analysis results have shown where the company has advantage over the competition, where advantages can be achieved with improvements and where this is not possible.

6 CONCLUSION

The paper presents a method of building a house of quality as one of the most important tools in the process of total quality management. A practical case of building a house of quality for an electromagnetic dosage facility is given. The results have proved that this method is useful for permanent improvements of product quality and for adaptation to the requirements, wishes and needs of the customer.

Experiments done so far have shown that well organized and creative team work is needed to build a really useful house of quality.

I OSNOVNA DELOVNA ENOTA

BASIC WORK UNIT

Osnovna delovna enota (ODE) je nova organizacijska oblika, ki šteje največ 20 članov. Je tehnološko sklenjena celota in izvaja primarno ali storitveno dejavnost.

Je oblika organiziranosti, ki omogoča posameznemu zagotavljanju stalnega napredka in bolje prilagajanje novim proizvodnim zahtevam.

Upravlja jo vodja osnovne delovne enote na podlagi kazalcev uspešnosti. Članovi osnovne enote laže vzpostavljajo med seboj večji kontakt pri dejavnosti na prelom.

A basic work unit (BWU) is a new form of organization consisting of 20 people at the most. In this technologically complete entity all its members are involved in work on the same basic production or tertiary sector activity, at the same location.

This organizational form enables the company to ensure continuing progress and to facilitate the adjustment to the new requirements in the field of production.

It is managed by the head of the unit on the basis of efficiency indicators. Members of a basic work unit feel more at ease when making contact with each other, and so they take an active part in the plant's drive towards progress.

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