
ERGONOMÍA OCUPACIONAL
INVESTIGACIONES Y APLICACIONES

VOL. 6

SOCIEDAD DE ERGONOMISTAS DE MÉXICO A.C. (SEMAC)

2013

ERGONOMÍA OCUPACIONAL

INVESTIGACIONES Y APLICACIONES

VOL. 6

EDITADO POR:

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WAYS TO APPLY OWAS METHOD TO EVALUATE THE POSITIONS TAKEN BY A CHARGER IN A SUPERMARKET STORAGE AREA	230
Gabriel Tadeo Zubirán Hurtado, Gilda María Martínez Solano, Rubén Varela Campos, Mauricio López Acosta	
ERGONOMIC EVALUATION IN AN AUTO SHOP USING THE REBA METHOD	239
Diego Moisés Sepúlveda Losoya, Mauricio López Acosta, Gilda María Martínez Solano, Luis Carlos Montiel Rodríguez	
STOVE CHINANTLA	249
Efren Toledo Toledo, Raymundo Ocaña Delgado, Francisco Platas López, Jorge E. Zarur Cortes y Santiago Osnaya Baltierra	
IMPLEMENTATION OF SOME PRINCIPLES OF LEAN MANUFACTURING WITH ERGONOMIC SUPPORT ANALYSIS	256
Rigoberto Zamora Alarcón, Tania Castañeda Madrid, Ariel Rubio Villegas, Jesús Edgardo Figueroa Lizarraga, Alan de Jesús Córdoba Pacheco	

STOVE CHINANTLA

Efren Toledo Toledo¹, Dr. Ed. Raymundo Ocaña Delgado², Mtro. Francisco Platas López², Mtro. Jorge E. Zarur Cortes² y Mtro. Santiago Osnaya Baltierra².

¹ Fellow of the Academic Industrial Design

² Full Time Professor

University Center UAEM Zumpango,
Autonomous University of Mexico State
Camino Viejo a Jilotzingo s/n
Valle Hermoso
Zumpango, Mexico State

e-mail: nefrett.02@gmail.com; rocanad@uaemex.mx; fplatasl@uaemex.mx;
jezarurc@uaemex.mx; sosnayab@uaemex.mx

Resumen: Durante la cocción de cualquier alimento se generan un sinnúmero de emisiones contaminantes, que gracias a las ventajas de los muebles utilizados actualmente en las cocinas, la caridad encuentra una salida para la gente. Sin embargo, en México, como en muchos otros países de América Latina y del mundo, donde la situación económica es precaria, el proceso de cocción resulta ser una importante fuente de contaminación, ya que las características de los edificios, el mobiliario y los combustibles utilizados, las emisiones se mantienen dentro espacios, de ocasionar daños a la salud de los habitantes. Un claro ejemplo de esto es la comunidad de San Juan Petlapa Chinantla que forma parte de la región Chinanteca, ubicada a unos 100 km de la ciudad de Oaxaca, una situación que cuando se analiza detenidamente, se ha puesto de manifiesto la necesidad de diseñar una cocina que va a mejorar las condiciones ambientales, y lógicamente, la salud de las familias de la comunidad de que se trate.

Palabras clave: Diseño, Estufa, Contaminación

ABSTRACT: During cooking of any food are generated countless pollutant emissions, which thanks to the advantages of the furniture currently used in kitchens, charity finds an outlet for people. However, in Mexico as in many other parts of Latin America and the world, where economic status is precarious, the cooking process turns out to be a major source of pollution, since the characteristics of buildings, furniture and fuels used, the emissions remain within spaces, creating damage to the health of the inhabitants. A clear example of this is San Juan Petlapa Chinantla community that is part of the region Chinanteca, located about 100 km from the city of Oaxaca, a situation that when analyzed carefully, has highlighted the need to design a stove that will improve environmental conditions, and logically, the health of the families of the community in question.

Keywords: Design, Stove, Pollution.

INTRODUCTION

As a matter of Yassi (2002), speaking of pollution is address any undesirable modification of the environment, caused by the interaction of physical, chemical or biological with it in quantities greater than natural, and which together are harmful to human health .

Today, air pollution is one of the most serious environmental problems and global concern. This is present in all walks of life, regardless of the level of socioeconomic development, geography or culture. Derivative of this pollution, every year the number of people suffering from respiratory diseases and others associated with the emission of pollutants, both indoors and outdoors goes on increasing.

Around this condition, in Mexico, as in many more populations of Latin America and the world, there are communities exposed to stationary sources of air pollutants, which in many cases all stems from the precarious situation in which they find or, to the neglect of abandoning traditions. Such is the case of San Juan Petlapa Chinantla community located about 100km from the city of Oaxaca, where the process of cooking food inside their homes has become a source of contamination, affecting both infants, youth and adults.

In this regard, according to studies by K. R. Smith to the FAO, in stoves and furnaces suitable and good combustion practices, you may clean consumption of firewood and charcoal, and other biomass, resulting mainly carbon dioxide and water. Corroborating such conditions are difficult to achieve in rural and urban poor in small used cheap fed with wood stove. For the wood that does not burn properly and becomes carbon dioxide results in incomplete combustion products such as: carbon monoxide, benzene, butadiene, formaldehyde, polyaromatic hydrocarbons and many other compounds hazardous to health.

Added to this must be the problem increases if the stove has not picked up chimneys or hoods to expel smoke outside. And although there have been no large-scale surveys statistically representative, hundreds of small studies worldwide in typical local situations have revealed that there are significant concentrations of small particles in the interior of the house, which can reach levels of long-term 10-100 times higher than those recommended by the World Health Organization (2005) in its revised guidelines on air quality to protect public health.

Significantly, despite the imprecision of measurements have been repeatedly detected various health effects in homes using biomass fuels, in most cases all or part wood. And among them are: acute infections of the lower respiratory tract (pneumonia) in young children, the leading cause of child mortality worldwide and the disease responsible for the loss of more years of life also globally, as well as chronic obstructive pulmonary disease, including chronic bronchitis and emphysema, in adult women who have been cooking for many years with solid fuels without adequate ventilation. Worrying and in relation to which through a paper published in the journal "Proceedings of the American Thoracic Society", experts have recommended the introduction of measures to reduce this type of indoor pollution, including lifestyle changes, improved ventilation and heating systems of homes (Torres-Duque, 2008).

OBJECTIVE

Designing a stove for families in the community of San Juan Petlapa Chinantla, Oaxaca, which allows cooking food safely, reducing the pollution levels indoors.

METHODOLOGY

The methodology used to address the problems identified is the design method called "transparent box", whose author responds to Christopher Jones and is configured specifically for three stages (Objective, Problem Analysis and Evaluation), although some were broken giving as resulting in a total of six steps. Significantly for Jones, is transcending design, using creativity, rationality and control organized to come up with something coherent and conscious.

Now, to be clear about the purpose, it was necessary to make a visit to San Juan Petlapa, a small village that belongs to Chinanteca, and which extends along the northeastern part of the state, adjoining the Veracruz north, northwest with the Mazatec region, with Cuicateca west and south-east with the Zapotec region. In this community, the residence is patrilocal basically. In the upper area of the region is the traditional adobe house with tile roof. While in the transition region is common to find wooden houses with thatched roofs or shingles, and at the bottom are constructions of roundwood or jonote thatched roof. In all cases the roofs have two outstanding and existing buildings in uptown tile is being replaced by leaf, and in the lowlands the jonote by wooden boards.



Figure 1. House transition region



Figure 2. House uptown

Now located in the community, the task was to gain access to the interior of the houses, to thereby observe the conditions in which the housewives cook at par, corroborate the data on the high levels of pollution generated. In relation to this activity, we identified three situations of concern, the first is that in an area no greater than 40m², is both kitchen, bedroom and area of coexistence, where in the best case there are divisions based fabric. The second is that in many of the small houses used for cooking food or leftover stones adobe blocks as support containers (pots), using wood as the main fuel. Exist at all times by the structure, the risk of an accident or spill hot liquids.



Figure 3. Stove with stones and wood



Figure 4. Based Fogón adobe blocks, sticks and firewood



Figure 5. Tortilla cooking stove with stones

Meanwhile, the third position also evident that in a large number of housing exists a stove made by the inhabitants themselves with adobe blocks, mud and a stones griddle as support, which on average have a length of 1.70m, with 0.50 m deep and 0.80m high. In it, there are three areas, intended for the preparation of food, one for cooking thereof and, perhaps most importantly, the area to take "tortillas".

Relevant is that during the stay in the community of San Juan Petlapa, and after application of the residents interviewed, information was obtained regarding cooking times, drawing attention only on normal days, Monday to Saturday the housewives spend between 4-5 hours making tortillas, initiating activity of preparing food at 4 in the morning. Time in which the fire is kept constant, and whose periods are increased twice during local festivals.



Figure 6. Solid foundation stove (3 areas)



Figure 7. Cooking tortillas in oven solid foundation

Stoves analyzing, both the base as the base stone solid was observed that in both cases there is a lack of an element able to avoid contaminating the smoke generated inside the house. Since the fire is fed below the griddle for wood, without a fuel containment area, allowing the smoke particles and those resulting from the processing of wood (ash) to spread freely.

Similarly, that existed comments regarding the conditions that the stove and the characteristics of the construction, the room gets too hot, the food usually presents ashes, comal constantly slipping from its supports, it becomes difficult intake process and is a frequent irritation in the eyes of both babies and adults.

Already with the previous body of information, it was determined that the problem was setting the fires or stoves used so far. So it was necessary to design an item that would reduce risks and damages to the residents of San Juan Petlapa during cooking.

After the stay in the community of San Juan, we proceeded to generate various proposed solutions, initially through sketches, which were improved by software doomed the representation of objects and atmosphere, as in the case of Solid Work, Rhinoceros and 3D Studio.



Figure. 8 Stove Chinantla

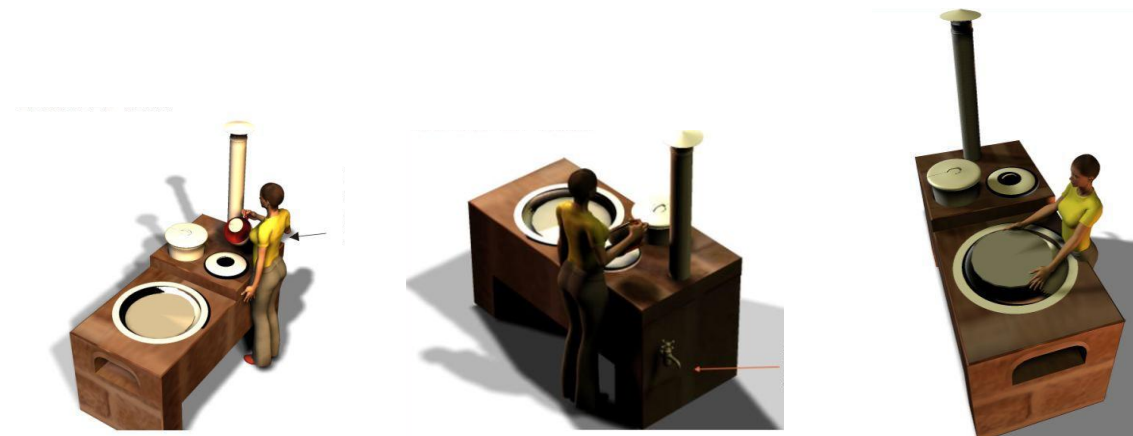


Figure. 9 Atmosphere of Stove Chinantla

RESULTS

Having determined the alternative specifications, we proceeded to generate a first prototype, which was tested. After verifying its functionality and make small adjustments, the team moved back to the community of San Juan Petlapa, making a family permit to build a stove inside your property, noting that issues of mistrust of the inhabitants, it was not possible it inside the house.

However, the design in question was built using materials that community might have on hand, as in the case of mud, clay and cement and readily available supplies despite the characteristics of the area. Comment is so two-dimensional that they did see two possible bases to work, a fully closed and the other hollow, where the latter had the advantage of having a space to store firewood and thus avoid leaving the house to get more fuel steadily. Of course, the decision would be subject to the economic status of each family.

Moreover, the stove Chinantla is a project that reduces fuel consumption, saves time and money, reducing eye irritation and respiratory diseases. Besides conserving, part of the culture of the community. Its features include, the ring having a curved metal, allowing griddle accommodate any size, also presents a liquid container capable of heating them through the radiation generated by the flame which assists the griddle, whereas in much help people in cold season will not be affected during the washing of utensils. Finally shows a key for the water outlet, allowing access to the vital liquid with ease.



Figure. 10 Chinantla stove use in the community of San Juan Petlapa

Even when it seems that in the XXI century man has managed to solve most of their needs through a simple or complex object, that's not entirely true. For as been allowed to see the work done in relation to the problems presented within a large number of dwellings in the community of San Juan Petlapa Oaxaca, the solution that the inhabitants had been generated in relation to cooking their food, despite the best intentions, in attachment to traditions and of course, based on its economy, has resulted in prejudice to his health.

Therefore, the stove Chinantla is a viable proposition, since it is created from readily available materials that do not affect the area or the environment. Besides allowing to maintain their traditions, and not meant to be a place to install another fire with the intention of "tortillas", but rather, seeks to be an element that preserves the sense of common identity as part of the community and the instead of the possibility of having a better quality of life.

Finally we comment that, to solve this project was quite difficult as sharing the lifestyle of a remote community such as San Juan Petlapa, reveals that there is much to be done for the benefit of society through design of new objects, it is believed that when we all live in similar conditions do not, so it will turn more frequently valuable eyes to communities rather than seeking to improve their economic reach, have elements required to ensure their health.

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