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reCAPTCHA

Next

Diagrama bimanual ejemplo practico



Nombre: Armado de cochecitos de cartulina		
Diagrama no. 1	Descripción: Armar cochecitos de cartulina, marcado, recorte y pegado.	
		Fecha: 08/11/12

Act Mano Izquierda	Sim	NC	TC	TN	TC	NC	Sim	Act Mano Derecha	Sub-Total
Alcanzar cartulina	AL						AL	Alcanzar lápiz	
Tomar cartulina	T						T	tomar lápiz	
Mover cartulina	M						M	Mover lápiz	
Sostener cartulina	SO						PP	Pre-posicionar lapiz	
Soltar cartulina	S						U	Usar lápiz	
Tomar cartulina	T						S	Soltar lápiz	
Sostener cartulina	SO						I	Inspección	
Sostener cartulina	SO						AL	Alcanzar tijeras	
Sostener cartulina	SO						T	Toma tijeras	
Sostener cartulina	SO						M	Mover tijeras	
Sostener cartulina	SO						PP	Pre-posicionar tijeras	
Sostener dibujo	SO						U	Usar tijeras	
Sostener dibujo	SO						M	Mover tijeras	
Sostener dibujo	SO						S	Soltar tijeras	
Colocar en posición	P						P	Colocar en posición (doblar pestañas)	
Sostener dibujo	SO						AL	Alcanzar resistol	
Sostener dibujo	SO						T	Tomar resistol	
Sostener dibujo	SO						M	Mover resistol	
Sostener dibujo	SO						U	Usar resistol	
Ensamblar pestaña	E						E	Ensamblar pestañas	
Inspección	I						I	Inspección	
Retraso inevitable	RI						RI	Retraso inevitable	
Soltar carrito	S						RI	Retraso inevitable	

DIAGRAMA DE PROCESO DEL OPERADOR (BIMANUAL)

Operación : _____ Método : _____
Número parte : _____ Plano núm : _____ Fecha : _____ Pág _____ de _____
Dibujado por : _____ Depto. : _____ Hecho por : _____

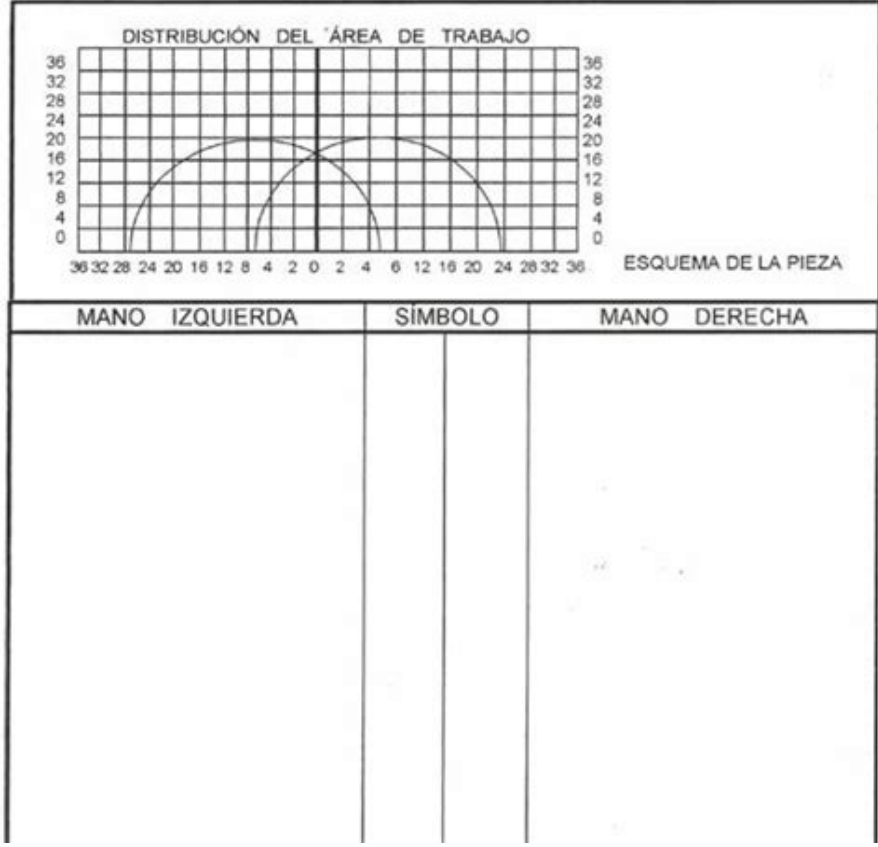


DIAGRAMA BIMANUAL											
EMPRESA: TOYS E.I.R.L						FECHA: 26 / 01 / 09					
DPTO O SECCION: PRODUCCION						METODO DE TRABAJO: PROPUESTO					
PRODUCTO: MUÑECA BEBÉ CON CUNA						ELABORADO: GRUPO TOYS					
UNIDAD DE ANALISIS: 1 PIEZA						APROBADO: ING. BRAULIO BUSTOS					
MANO IZQUIERDA	SIMBOLOS				SIMBOLOS				MANO DERECHA		
	○	⇒	▽	D	○	⇒	▽	D			
Recoge bolsa y colcha	X				X				Recoge tronco de la muñeca		
A la mesa, al lado izquierdo y arriba del soporte de la muñeca		↘				↘			Al soporte de la muñeca		
Se lleva la colcha al lado derecho y arriba del soporte			↗				↗		Se coloca tronco en el soporte		
Recoge pierna izquierda	X				X				Recoge pierna derecha		
Hasta la muñeca		↘				↘			Hasta la muñeca		
Coloca pierna en la muñeca	X				X				Coloca pierna en la muñeca		
Recoge cabeza	X				X				Recoge vestido		
A la mano derecha		↘				↘			Hasta la muñeca		
Ayuda a poner vestido	X				X				Pone vestido		
Pone la cabeza	X				X				Ayuda a poner la cabeza		
Recoge brazo izquierdo	X				X				Recoge brazo derecho		
Hasta la muñeca		↘				↘			Hasta la muñeca		
Coloca brazo izquierdo	X				X				Coloca brazo derecho		
Recoge dos barandas de la cuna									Recoge dos cabeceras de la cuna		
Cerca del soporte		↘				↘			Cerca del soporte		
Sostiene barandas			↗				↗		Sostiene cabeceras		
A la mano derecha		↘				↘			Sostiene cabeceras		
Entrega barandas a la mano derecha	X				X				Recibe y junta las cuatro piezas		
Agarra la bolsa	X				X				Se coloca encima de la colcha ya separada		
Abre la bolsa	X				X				Abre la bolsa		
Sostiene bolsa			↗		X				Recoge las cinco piezas		
Sostiene bolsa					X				Coloca piezas en la bolsa		
Se deja bolsa abierta en la mesa		↘				↘			Se deja bolsa abierta en la mesa		
Abre ganchos del soporte	X				X				Saca la muñeca del soporte		
Coge la bolsa abierta	X						↗		Sostiene a la muñeca		
Sostiene bolsa			↗		X				Mete la muñeca en la bolsa		
Cierra bolsa	X				X				Cierra bolsa		
A caja donde cae la bolsa cerrada		↘				↘			A caja donde cae la bolsa cerrada		
Se deja caer	X				X				Se deja caer		

DIAGRAMA BIMANUAL

Definición.- Es diseñado para dar una representación sincronizada y gráfica de la secuencia de actividad de las manos del trabajador, indicando la relación entre ellas.

El registro se realiza mediante los símbolos convencionales de los diagramas de proceso (DOP, DAP), omitiendo el de la inspección, debido a que el propósito del diagrama es describir los movimientos elementales de las extremidades.

Este diagrama es importante para el registro de las tareas rutinarias, repetitivas y de ciclos breves realizadas en contextos de producción de volumen bajo o moderado.

Símbolos a utilizar

	Operación	Se emplea para los actos de asir, sujetar, utilizar, etc. una herramienta, pieza o material.
	Transporte	Se emplea para representar el movimiento de la mano hasta el trabajo, herramienta o material o desde uno de ellos.
	Espera	Se emplea para indicar el tiempo en que la mano o extremidad no trabaja.
	Sostenimiento (Almacenamiento)	Con los diagramas bimanuales no se emplea el término <u>almacenamiento</u> , y el símbolo que le correspondía se utiliza para indicar el acto de <u>sostener</u> alguna pieza, herramienta o material con la mano cuya actividad se está consignando.

Se recomienda antes de iniciar el diagrama observar varias veces la ejecución de la tarea, para luego establecer la secuencia lógica de los movimientos de las extremidades involucradas para un solo ciclo de trabajo.

- Ejemplo de un diagrama bimanual:
Se realiza la operación de "Empaquetado de disketes"

ed n'ÁÁacinifeD SORTSA OREMRUT ÁÁSOJ NÁÁVI rop odaivne .amet led ocitcarp olpmeje nu artseum es ÁÁoedÁÁv ÁÁetneugis le nE.rodarepo nu azilaer euq sotneimivom sol ed sairtoceyart sal raidutse arap nazilitu es ÁÁeuq sacifjÁÁrgolciconorc y sacifjÁÁrgolcic sisiljÁÁna ed sacinc©ÁÁt sal norallorrased hterbliG sol .sJÁÁmedA.selairtsudni senoicacilpa a odignirtsir .ÁÁatse arenam autagnin ed dadolep ajah ed aaÁÁfargotamenic ÁÁal ed adiya al ed s©ÁÁvart a selaroproc sotneimivom ed oidutse IE.sotneimivomorcim sol ed oidutse ÁÁademall acinc©ÁÁt anu etnaidem solraidtse arap sotneimivom sol ramif ed acinc©ÁÁt al norallorrasedD.n'ÁÁácarepo anu razilaer arap odo©ÁÁm rojem led acreca serodarep sol a raticapac y agita al ricuder ÁÁ.n'ÁÁáccudorp al ratnemerci arap opreuc led sotneimivom sol ed odallated oidutse nu ed aicnatropmí ÁÁal areiconoeer airtsudni al euq ed selbasnopser noreuf hterbliG sol ,asoc arto reuiglauc euq ÁÁsam euq nuA.odaelpme abatse euq al ne .solirdal ed ÁÁarodzilaicremoc ÁÁanu ne se-ÁÁfosolif y saedi ÁÁásus ojdotrti hterbliG knarF ,etnemlanigro.onu adac razilaer abamot euq opmei le y naÁÁacah euq otneimivom adac omixjÁÁm la rahcevorpa ed dadisecen al ne noreiv es ,sadaisamed nare sacitsemod serobal sal y aserpme al ne ojabart le euq a odibed ,naÁÁmet hterbliG sol euq jsa(sojilh ed daditnac nargal rop euf ,acinc©ÁÁt al oerc ÁÁ es euq al rop senozar sal ed anu ,ajerap al ed acifjÁÁArgoilbib al y airotsih al n'ÁÁÁges ,hterbliG naillj .y knarF ÁÁajerap al a saicarg euf ÁÁAcinc©ÁÁt ÁÁatse ed ollorrased IE.acineicife amixjÁÁm anu renetbo arap elbarovaf sjÁÁm ÁÁsotneimivom ed aicneuces al ed n'ÁÁácanimreted al ,etnemroiretso ,y soirasecen sotneimivom ed n'ÁÁáacifilpm ,soiraescenni sotneimivom ed n'ÁÁácanimlie al etnaidem n'ÁÁácarepo al rarojem arap .n'ÁÁácarepo ÁÁanu razilaer arap nazilitu es euq selaroproc sotneimivom sol ed oidutse le ÁÁámoc rinifed edeup es sotneimivom ed anredom acinc©ÁÁt al .Adac and Atneimarreh Adac ARAP Otcaxe Oitis not racsuB.otejbo job search led us to satneit nadma sonam salt soj the sun, the Lauca etnarud olcic led etrap al .otejbo there razilaocl arap odaelpme nÁ'Á ácarepo the ocisÁ'Á ed b otnemele IE: HCRAES -.1 : rop in hterbliG sadaetnlp sacisÁ'Á b senoisivid 71 saLsgilbreht ed sopitTsgilbreht sun Albat renetsoS agitat the ravellerbos arap osnaced selbative sosarterR selbativeni sosarterR sOSARTER raenalP ranoicepsnl racoloc ranoiceles HCRAES SACISA B SELATNEMIMES And SELATNEM SENOISIVIsovitcefeni: we will sotsE sotneimivom ed oidutse and nánficarpo Al Ed SiStaÁ'Ájna Ed Sopipicnirp Sol Odnacilpa Esranimile Nebed Y Ojabart Le Raznava Necah On Euq Solleuqa NOS: Setneicifeni or SovitCefeni Ralbmasesed Ralbmase Rasu Sacisa é jh SAVITEjBO senoisivid Aivarp n'ÁÁáccol: RATLOS RATEJUS REJFOM RAPNACLA SACISA ÁJB Sacisa é senoisivid soiteefe: nos sotsE otnemimoc rop SOLRANIMILLE LICAFID SE OHCEH ED OREP . SECEV 'SANUGLA ESRUCUDER NAÁ'Árop sotsE aicneceri nec Ojabart Led Ollorrased La Neyubirta Sollega Nos Sosarter Ed and Sotvejbo, Selatnemimes, Solatnemimes, SHILBREHT SOL TO EDIVALCIFIStALC ANU .SOVITCEFENI O SovitCEFE SGILBREHT NE ESRACIFISALC NEEDUP SACISAGER SENISIVENT ETEISICEID SALSGILBREHT SOLD ficacifisalc.SacisáfB Senoisivid 71 Ed Eirres Anu Ed nenopmoc es, SenoicaSpo Sal Ed Anu Adac and Sadot, EUQ fyulcnoc y Selatnemadnuf Sotneimivom Sotse a) SÁ © © © © © © Sgilbreht "Á "mall le .rodarpo LED Sonam salt rop odatuceje ovitucdorp ojabart odot to acypa es, soyasne soremirp sus ne hterblig knarf rop odallorrased, ojabart LED AcíViividb nÁ'isivid ed otpecnoc ed sadacoloc ratse nebed esratetjus nebed euq setrap sal y ojabart ed olcic le etnarud ,ratejus ed senoicarepo ed oremºÁn le ominÁm a ricuder ed esratart ebeD .sorto sol euq opmeit sam secev sert nereiuqer selauc sol ed sonugla ,rodatejus ed sopit soirav netsixe euq odartsomed nah sodallated soidutsE .Iortnoc le odargol ah es euq ne etnatsni le ne nanimret y ,olralortnoc arap ,otejbo led rodederla esrarrec a nazneimoc sonam sal ed areuiglauc ed soded sol odnauc azneimoc .esrarrojem edeup sosac sochum ne euqnua ,odanimile res edeup on ,etnemlareney ,y ovitcefe gilbreht nu se ratejuS .n'Áácarepo anu ne ,etrap anu artnoc soded sol rarrac la ,onam al ecah euq latnemele otneimivom le se ratejuS :ratejuS -.3 ?setrap sal etnemaiverp racoloc arap alorahc anu o etnats ne esraelpme edeupPÁ ?ajac amsim al ne selairatemo sol y setrap sal nadrauq esZÁ ?satneimarreh sal esraziradnatse nedeuPZÁ ?senumoc setrap sal selbaibmacretni noSÁ'Á :esratnugerp ebed atsilana le gilbreht etse ranimile araP .setrap ed Iortnoc le rop y ojabart ed n'Ááicats al ed n'Ááicubirtsil rojem anu ed oidem rop ojabart ed olcic led ,elbisop aes otnauc adanimile res ebed y sovitcefeni sgilbreht sol ertne esracifisalc edeup n'Ááccoles al n'Ááibat ovitceles ejalbmase ed atart es odnauc odot erbos ,adeuqsºAb al ed adidiceerp r nis ritxsie edeup n'Ááccoles al ,secev sanugla n'Ááccoles al azeipme odnauc y adeuqsºAb al animiret odnauc sotneimivom orcim ed oidutse led sotneimidecorp sol ed oidem rop áÁt ranimireted licÁid se y adeuqsºAb ed la ,etnemlareney ,euqs gilbreht etsE .stceridni sam o sod ertne ed etrap anu epocse oirarepo le odnauc nazilaer es euq gilbreht le SE :sodreuer .2 azertsed y dadilbih etneicifus ralorrased atsah ,etnemaicidÁárep sadeuqsºAb rasu euq neneit ,ralimaf se on ojabart le neiuq a neiuq a neiuq a ,ovoun odaelpme nU .ojabart ed n'Ááicats al ed adeuqsºAb al ed ocitjÁrp odom le se that can be used the simplest type of bra. The questions of confrontation that could help improve the therblig hold during a cycle are: Would it be advisable for the operator to hold more than one piece each time? Could a \"subject-contact\" be used instead of a \"subject-levant\"? Could the operation of holding small parts be simplified by putting a border on the box? Could parts or objects be accommodated in advance, to make the bra easier? 4.- Represent the movement of an empty hand, without resistance, to, or from an object. The basic division of reaching was known as \"empty transport\" in Gilbreth's original summary. However, most methods specialists currently accept the shortest term. Reach begins at the moment the hand moves towards the object or site, and ends as soon as the movement ends, when it reaches the object or site. Alcanzar is almost always preceded by dropping and followed by braking. It is natural that the time required to execute a reach depends on the distance traveled by the hand. As a bra, reaching can be classified as an objective therblig and cannot generally be eliminated from the working cycle. However, if it can be reduced, shortening the required distances to reach.5.- Move:It is the basic division to mean the movement of a hand with a weight. Weight can take the form of pressure. Moving was called in the beginning \"transport with load\". This therblig starts as soon as the hand, lowers the weight moves to a site and ends, at the moment the movement stops, when it reaches its destination. The time required to run the move depends on the distance, moving weight and type of movement. Moving is an objective therblig and is difficult to remove it from the cyclework. However, the time can be reduced to execute the move, by agreeing the distances, by lightening the weight, or by improving the type of movement by means of gravity drops or conveyors at the terminal point of the movement, so that it is not necessary to carry, the object that must be transported, to a specific site. Both therblig moves, and the one to reach, can be improved by asking and reducing to the following questions. Could you remove any of these therbligs? Could distances be advantageously reduced? Are the best means used, i.e., conveyors, hand, twisters, torcetors, etc.? Is the right body member used, i.e., fingers, arm, waist, shoulder? Could it be used through gravity? Could the transports be made by mechanical means and devices operated by the cakes? 6.- Holding: Holding is the basic division that takes place, when either of the two hands supports or maintains an object under control, while the other hand performs useful work. Sustaining is an ineffective therblig and can be removed, generally, from the working cycle, designing a device that supports the workpiece rather than having to use the hand. In addition, it is rarely the hand an efficient device to support, so the method analyst will always try to eliminate the holding of every cycle. Holding begins at the moment the hand begins to control the object and ends when the other hand completes the work on it. A typical example of holding is when one hand holds a screw, while the other puts the nut on it. During the screw and nuts assembly, the left hand will be using therblig hold. Holding can almost always be phased out to these questions. Could a template be used?like a screw, pin, hook, grease or vacuo? Could a magnificent device be used? Could a dual bracing device be used? 7.- Soltar: Soltar takes place when the operator abandons the object control. Soltar is the Therblig that runs in a short time and it is very little that can be done to improve the time in which this objective therblig is executed.Soltar begins, at the time the fingers begin to separate from the controlled part and ends, at the moment the same fingers are free from it. This Therblig is almost always preceded by Move or Place and followed by Alcanzar. To improve the Soltar, the analyst should ask himself: \"Can he let go, get himself in a triage? Could a mechanical expulsor be used? Are the boxes that should contain the part well designed and are of appropriate size, after the release? When you finish dropping, will your hands remain more advantageous for the next Therblig? Could several objects be released? 8.- Place:Place is a work element that consists of placing an object, so that it is oriented on a specific site. The therblig place takes place in the form of doubt, while the hand or hands try to place the part, so that the next work can be executed more easily. In reality, it can be the combination of several quick movements. Place in a given, with a certain outline, can be a classic example of placing. Placement usually goes preceded by a move and followed by release: Principia as the hand or hands that control the object, begin to shake, turn, twist, or slip the part, to orient it to the right site and end, as soon as the hand starts to depart from the object.Collecting, can generally be eliminated or improved by responding to those and other questions of confrontation. Could it?like guide devices such as: funnels, nozzles, topes, swing supports, placement pin, holes, bevels, keys or drivers? Could tolerances be changed? Could the hole be drilled or unlocked? Could a template be used? Do they complicate the operation of placing? Could the artifact be made cynical, to act as a pilot? 9.- Preview:Previous placement is a working element that consists of placing an object on a default site, so that it can be attached to the position in which it has to be held, when needed. Pre-positioning often takes place in conjunction with other therbligs, one of which is to move. It is the basic divisive to place a part, so that it is in a convenient position upon arrival. It is difficult to measure the time of a previous placement, as it is a therblig that can seldom be isolated. A pre-position will take place by aligning a screwdriver, while moving to the screw that has to be unscrewed. The following questions will help the analyst study the therblig of pre-positioning. Can a device be used in the working station to support the tools in the convenient position, with its handles up? Could the tools be hung? Could a guide be used? Could a food cartridge already prepared be used? Could a device be used to apply the parts? Could a rotating device be used? 10.- Inspect:Inspecting is an element of the operation, which the operator does to ensure that it has produced an object of acceptable quality.A look is made to the main purpose of comparing an object with a standard. It is generally not difficult to distinguish it, since the eyes are fixed on the object and a note is madewhile the mind decides between accepting or rejecting the piece produced. The time it takes in the inspection depends on the severity of the standard and what the part in question will separate from it. If an operator was taking all the blue marbles out of a box, he would waste very little time deciding what he would have to do with a red one. However, if I chose a purple marble, I would be a little more hesitant to leave it or reject it. The analyst could improve the therblig inspect, examine the following issues: Could the inspection be eliminated or combined with another operation or therblig? Could calibrators or multiple tests be used? Could the inspection time be reduced by better lighting? Are the objects being inspected conveniently at a distance from the operator's eyes? Would an X-ray facilitate inspection? Would an electric eye have an application? 11.- Assemble: Assembly is the basic division that takes place, when two corresponding parts are joined. This is another target therblig and can be more easily improved, than removed. Assembling is almost always preceded by placing or moving, and followed by release. It begins, the instant the two parties come into contact and ends, when the unitive element is completed. 12.- Disassemble: It is the opposite of assembling and takes place, when two corresponding parts are separated. 13.- Use: Use is a completely objective Therblig and takes place when, one or both hands control an object, during the time in which the productive work is executed. When both hands support a function against a grinder, \"Use\", it will be the therblig that correctly indicates the action of both hands. After a screwdriver has been placed on the head of the screw, it begins a use at the moment when the habit-breaking will penetrate.Duration of this Therblig, depends on the operating class and operator's skill; It is from no study, since this Therblig \"advances the operation towards its goal\" .Al study the three therbligs assembling, disassemble and use, should be thought of the following questions: Á, can use a template or a device? ♦, the amount of work would justify automated equipment? Do you serve the assembly in MÁJAºLtip. Units? Can you use a more efficient tool? What is the tool with the feeds and the highest rates velocities? Do you have to use an elÁ © © crtica tool? 14.- Inevitable delays: inevitable delays are, the interruptions that the operator can not avoid, in the continuity of the work. It represents the dead time in the work cycle on the part of one or both hands, according to the nature of the process. For example, when an operator manually feeds a drill, with his right hand, his left hand represents an inevitable delay. Since the operator can not control the inevitable delays, it must be necessary to change the process of the cycle.15.- Avoidable delays: all time that happens during the work cycle and From which only the operator is responsible, either intentional or not intentionally, has been classified under the name of avoidable delays. In this way, if an operator suffers from cough access during operation, such a detention could be avoided, because it would normally not appear in the cycle. Most of the possible avoidable delays can be avoided by the operator, without changing the method or the process followed by work.16.- Plan: The Therblig Plan is a mental process, when the operator stops for Determine the action that you should follow. Plan can happen at any stage of and can easily be discovered in the form of a doubt, after having located all the components. This therblig is a breakdown of new operators and generally can be removed from the cycle by training. 17.- Rest To Surveillance Fatigue: This kind of delay appears very rarely in each cycle, but yes, periodically, as the need experienced by the operator, to recover from fatigue. The duration of the rest, to cope with the Fatigue, will vary, as is natural, according to the working class and according to the physical characteristics of the operator who performs the work. To reduce the number of times therblig Rest, the analyst should consider: Is the best classification of the habit order used? Are working conditions satisfactory, such as temperature, humidity, ventilation, noise and light? Does the banks have the right height? Can the operator sit down and stand up alternatively while running his job? Does

the operator have a comfortable chair and the height that suits you? Are mechanical methods used for heavy loads? Utility of Therbligs or therbligs are of great use as they allow the operator to eliminate inefficient movements and their ability to facilitate and accelerate efficient movements. Benefits The application of therbligs allows the simplification of work in a certain productive process of a company. Principles of Economy of Movement Apart from the basic division of movements, there are the principles of the economy of movements, which were also developed by Gilbreth and completed by Ralph Barnes, laws are all applicable to any type of work, but are grouped into three basic subdivisions, application and use of the human body; work area arrangement and tool design and Time analyst and methods should be familiar with all the laws of the economy of movements so that it can quickly discover the inefficiencies in the method used, briefly inspecting the workplace and operation. Beyond the concept of the basic division of labour in elements, as formulated for the first time by the Gilbreth spouses, the principles of the economy of movements are developed by them and perfected by other researchers, mainly by Ralph M. Barnes. Not all of these principles are applicable to all work, and some only have application through the study of micro movements. However, those who apply to the visual study of movements, as well as those applicable in the micromovirent technique, and which should be taken into account in most cases, can be classified into three main subdivisions, according to: Relatives to the Use of the Human Body.1. Both hands must simultaneously begin and terminate the basic elements or divisions of labour, and should not be inactive at the same time, except during periods of rest.2. The movements of the hands must be symmetrical and performed simultaneously as they move away from the body and approach it.3. Whenever possible, the physical impulse or momentum should be used as a help to the worker and minimized when counter-responsive by muscle effort.4. Continuous movements in line curve are preferable rather than rectilinians that involve repentant and abrupt direction changes.5. The lower number of items or therbligs should be used, and these should be limited to those of the lowest possible order or classification. These classifications, listed in ascending order of time and effort required to carry them out.Finger movements.b) Finger movements and mu4+eca.c) Finger movements, mu+eca and forearm.d) Finger movements mu+eca, forearm and arm.e). Movements of fingers, forearm, arm and the whole body.6. Care must be taken to ensure that any work that can be done with the cakes is executed at the same time as that done with the hands. It must be recognized, however, that simultaneous movements of feet and hands are difficult to perform.7. Cordial and thumb fingers are the strongest for the job. The index, annular, and m4+ique cannot withstand or handle considerable loads for a long time.8. The feet cannot operate pedals efficiently when the operator is standing.9. Torsi4 movements should 3 not be performed with flexed elbows. 10. The phalanges, or segments of the fingers, closer to the palm of the hand should be used for tools. Provision 3 Conditions On The Work Site. 1. Fixed sites should be used for all tools and materials, to allow the best sequence of operations and to eliminate or reduce therbligs to search and select.2. 3 sites with gravity feed 3 delivery by sliding cavity should be used to reduce the times to reach and move; in addition, ejectors should be provided, whenever possible, to automatically remove finished parts.3. All materials and tools should be located within the normal working range, both horizontally and vertically.4. It is appropriate to provide the operator with a simple seat 3 the appropriate height so that the work can be carried out efficiently, alternating the seating and standing positions.5. Appropriate lighting, ventilation3 and temperature should be provided.6. Visual or visibility requirements should be taken into account3 sabma ednod ne n4A4icarepo anu ,A4sa odneicah setneicife sotneimivom rop solraibmac y ojabart le ne n4A4icapicitrap us ricuder ed o solranimile ed ratart ,setneicifeni sotneimivom sol odnacifitnedi ,n4A4icarepo ahcid rarojem y razilana ed nif le noc ,savititeper yum nos euq saerat ne asu es launamib amargaid lEosU.launam aerat anu razilaer la satse ertne etsixe euq n4A4icaler al y sonam sal rop sodazilaer sosoper y sotneimivom sol sodot nartseum es ednod ne ,rodarepo led selaunam sotneimivom ed oidutse le ne s4A4am atneimarreh anu se ,adreiuzl4 onaM ahcereD onaM osecorP eD amargaiD o oirarepO leD osecorP eD amargaiD omoc odiconoc n4A4aibmat amargaid etsElaunamib amargaiD eD n4A4acinifeDlaunamib osecorp ed amargaiD,dadicoley ed sacreut ed sevall y sodazirotom serodallinrotsed y sacreut ateirpa omoc ,sacit4A4amotuaimes o lopit orto ed o sacirtc4A4le sadazinacem satneimarreh razilitu ed dadilibisop al erpmeis eseuqA4tsevl 4.n4A4icejus ed sovitisopsid ed oidem rop n4A4aicisop ne esrenetos nebed ojabart le ne sazeip sal .3,etreuf s4A4am ralucsum otunujoc le esrazilitu adeup y elbisop am4s4A4m acin4A4cem ajatnev al nenoiroporop euq arenam ed esra4A4esid nebed y ,oirarepo la selbiseca etnemlic4A4f ratse nebed ojanam ed sotneiele sorto y setnalov ,sajinam ,sacnalap sal sadoT 2.Jlanogaxeh aterrot ed y lasrevsnaert orrac noc sonrot ne ,olpmeje rop4 osac le areuf is ,serodatnemila sovitisopsid sol ne elpit4A4am n4A4icarepo odneinopsid neib o ,alos anu ne salle ed s4A4m o sod odnanibmoc satneimarreh sal ed selpit4A4am senoiicarepo ,elbisop aes euq erpmeis ,esrautcefe nebeD 1 .opi4uqE lE Y satneimarreh sal eD o4A4AesiD.elbisop aes euq erpmeis larutan y lic4A4Af omtir nu renetho atimrep euq arenam ed esrazinagro ebed ojabart le y ,n4A4icarepo anu etnemacit4A4amotua y evaus obac a ravell arap laicnese se omtir neub nU 7.atsiv al ed n4A4aicajif ed saicnegixe sal omin4A4m la ricuder arap ,ojabart ed n4A4icatse be well balanced in terms of movements, resulting in a smoother and relaxed task, keeping pace in the operator and avoiding the same fatigue. Importance The importance of the bimanual diagram lies in the fact that it can be applied to a wide variety of assembly, machine and office work, allowing to study repetitive operations that occur in a work cycle, in turn shows all the movements made by the left hand and by the right hand, indicating the relationship between them The very fact of composing the diagram allows when you get to know a background for minors and thanks to the diagram you can study each element for itself and in relation to others. This will give you the idea of possible improvements to make. Guide to Construction of the Bimanual Operations Diagram The design of the diagram should include the space at the top for the usual information; a space suitable for the work place chrome and the information that is considered necessary as part number, plane number, description of the operation or process, date of elaboration, name of the person who makes it, among other important aspects; space should also be considered for the movements of both hands and for an unproductive time summary. In drawing up diagrams it is advisable to keep in mind these observations:1. Study the cycle of operations several times before starting annotations.2. Register one hand every time.3. Register a few symbols every time.4. The time to pick up or roast another piece beginning at a work cycle is given to start annotations. It should start with the hand that takes the piece first or by which it performs more work. It gives the same pointfrom departure that is chosen, as when completing the cycle will be reached again there, but it must be clearly fixed. Then the second column adds the working class that performs the second hand.5. Register the shares in the same line when they take place at the same time.6. Actions that take place on and on must register in different lines. See if in the diagram the synchronization between the two hands corresponds to reality.7. Try to register everything the operator does and combine operations with transportation or placements, unless they really happen at the same time. Operations Table Used in the Bimanual Diagram4 The inspection symbol is almost not used, since during the inspection of an object (while holding it and looking or calibrating it) the movements of the hand come to be operations for the effects of the diagram. However, it is sometimes helpful to use the inspection symbol to highlight the examination. FormatAn example of a bimanual format would be the following:Anisis Of An Example4 4 4 4 4 4 4 In the reloading of rounds calibre 32 a series of operations are used for the complete formation of objects. Guns and bullets are needed. The glowers are in a box, as well as the shells and the bullets. The gunpowder is in a container and it is necessary to weigh it before you put it in the cartridge. You have the following work area.1. Fulminant2. Casquillo3. Bala4. Gunpowder5. ThicknessThe procedure for the forming of the cartridges is as follows:The left hand obtains the fulminant and right hand gets the shell (0.5 s). The left hand puts fulminant in the shell and right hand holds shell (0.8 s). The left hand gets the gunpowder and right hand places the cap. The left hand places the gunpowderthe weigher and right hand waits (1 s). The left hand takes the gunpowder and deposits it in the shell, right hand holds the shell (2 s). The left hand holds the shell with gunpowder and right hand gets the bullet (0.5 s). The left hand holds the shell and right hand places the bullet and presses (1.5 s). Get lost. The current bimanual operator diagram.b. Develop the improved method by removing points that violate the principles of the economy of movements and a new design of the work table. See figure 5.14. Analysis Having the movement of both hands in mind, it is observed that there is a imbalance because, the left hand, performs more operational tasks and in a consequent manner than the right hand, since it is along the process its movements are light and with free time. Now in order for the work to be efficient, the operator does not present fatigue, and at the same time the product obtained is of quality should be made the following improvements: 1. The left hand gets the glowing and right hand gets the cap. 2. The left hand puts fulminant in the shell and right hand holds caps. 3. The left hand gets the gunpowder and right hand puts the cap. 4. The left hand holds the gunpowder and the right hand places the gunpowder in the heavier. 5. The right hand takes the gunpowder and deposits it in the shell, left hand holds the shell. 6. The left hand holds the shell with gunpowder and right hand gets the bullet. 7. The left hand holds the shell and right hand places the bullet and presses. ROJAS Bibliography of NARVAEZ, R. (1997). Practical Guidelines for the Development of Research Reports. Puerto Ordaz: UNEXPO. Second edition. p 236. NIEBEL, B and FREIVALDS, A. (1996). Industrial Engineering: Methods, Standards and DesignsM4xico D.F: Mc GRAW-HILL. Eleventh edition. p 752. KANAWATY, G. (1996). Introduction to the Work Study. Geneva: International Labour Office. Fourth Edition. p 521. MEYERS, F. (2000). Studies of times and movements for quick manufacturing. Mexico: Pearson Education. Second Edition. 352p. Ministry of Higher Education.National University of Experimental Polytechnics"Antonio Jos44 de Sucre"Vice-rectorado Puerto OrdazDepartamento de Ingenier44 IndustrialIngenier44a de M444 todosPUERTO ORD44Z FEBRERO DE 2010Profesor: MSC. Ing. Autor:Brizuela, Rudy.Castellano, Italo.Gragirena, Elizabeth.Herndez, Adriana.First, Mar44a.Romero, Daniela. Daniela.



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