KAIZEN Concept of Assembly

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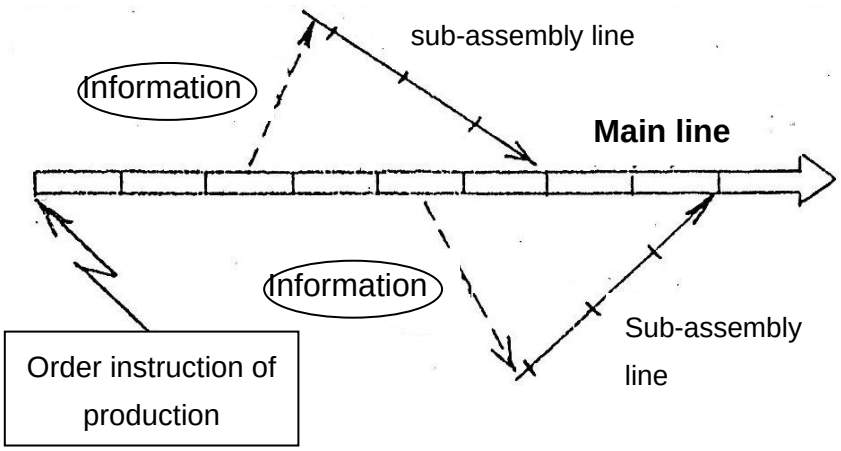
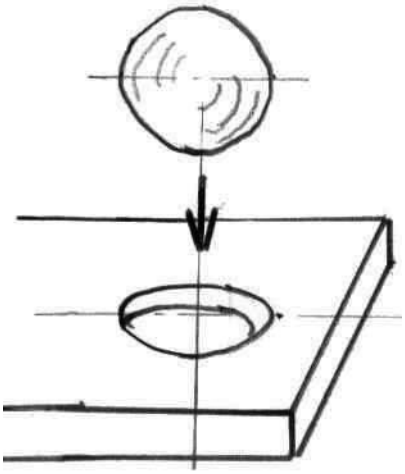
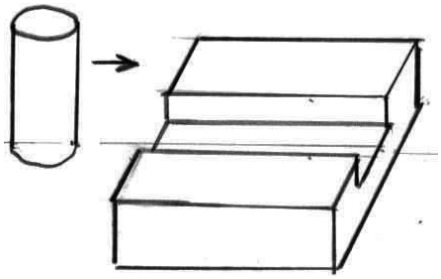
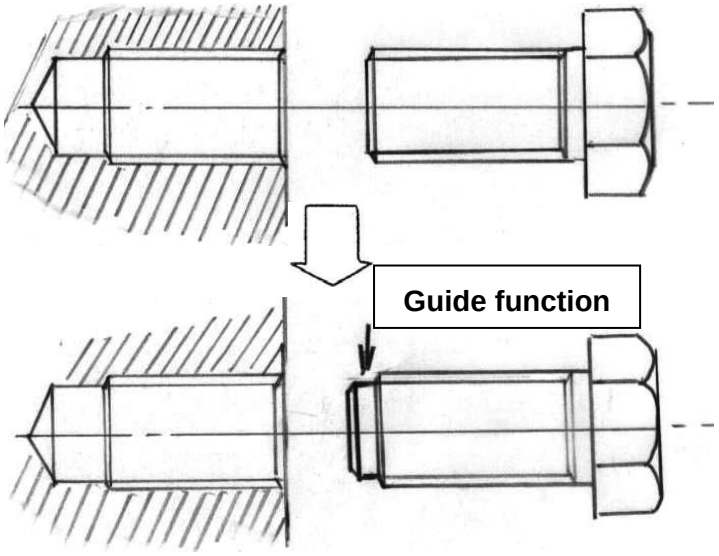
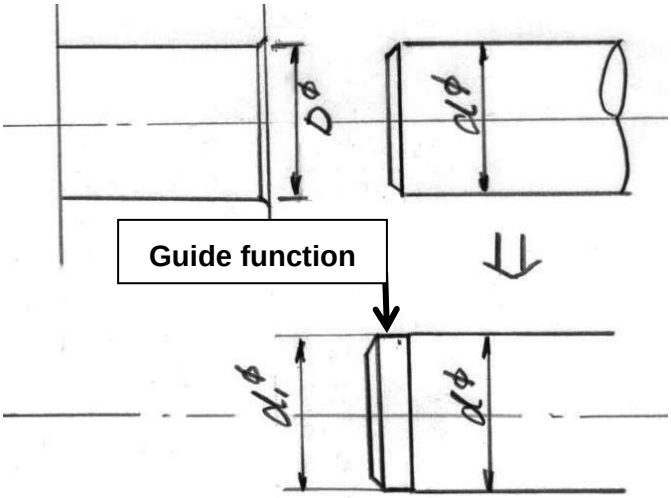
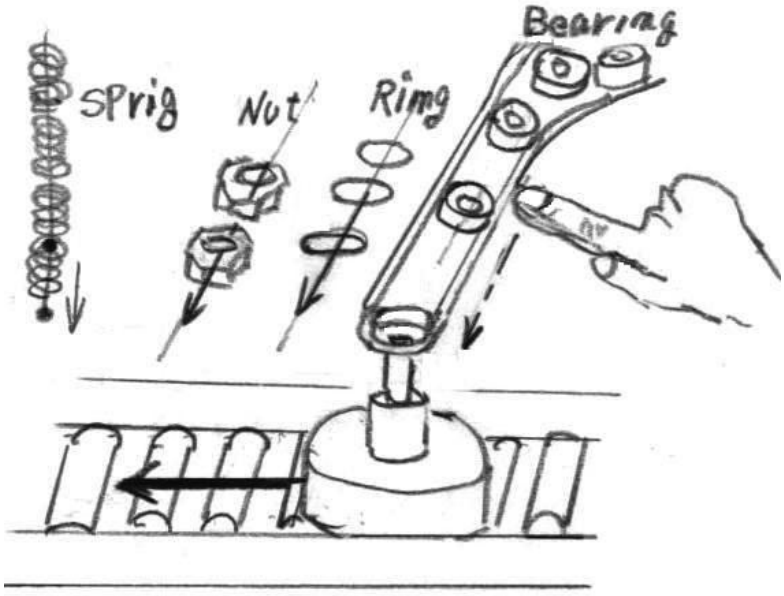
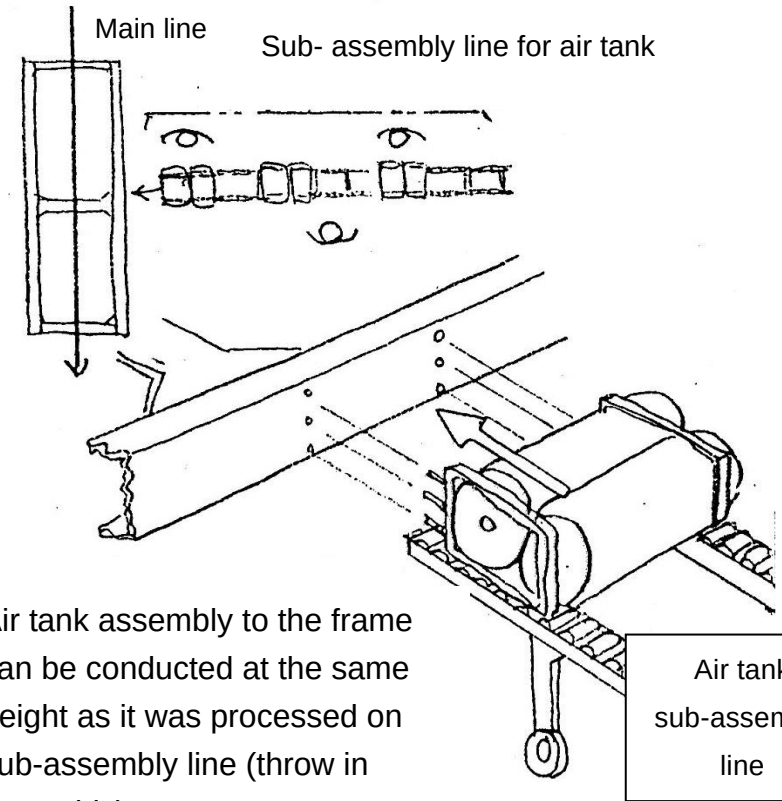
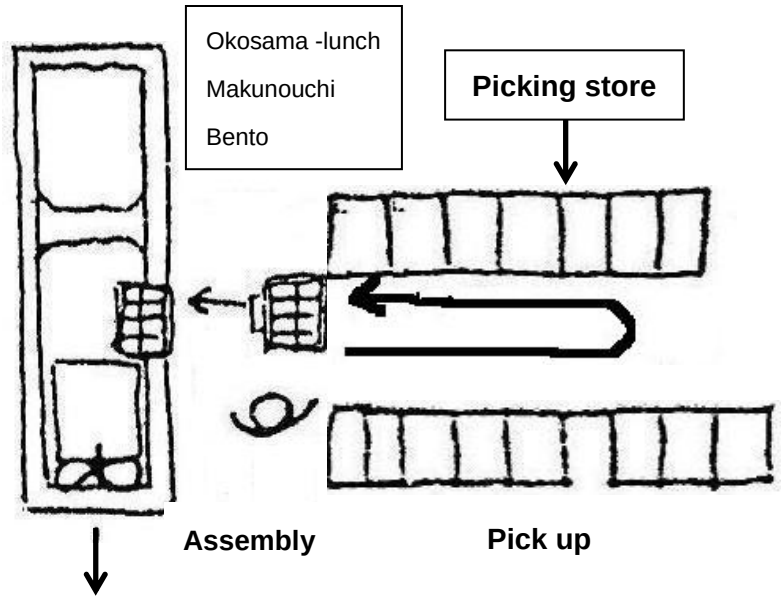
	Method development	Image
1	Synchronization of main assembly line and sub-assembly line *Information flow; Order instruction of production should be sent only to the beginning process of main assembly line. Order sequence for sub-assembly line will be determined by the progress of car assembly on main assembly line	<Assembly line layout >  Main line is considered as a back bone of fish and sub-assembly lines are medium and small bones connected to the back bone.
	Major work should be assigned to main assembly line. Medium and small work should be assigned to sub-assembly line	*Major work … Assembly of unit component <Main line> *Small and medium work …assembly to make unit component < sub-assembly line> Example *Air tank, Door assembly, Tire, Instrument panel,
	Layout of sub-assembly line against main assembly line (Connect sub-assembly line to main assembly line) (One large room concept and Short lead time)	By positioning sub-assembly line next to main assembly line, an operator of sub-assembly line can help main unit assembly line process as needed (Same TAKT time) <Flexibility to adjust the difference of number of processes between main and sub assembly line>

2	Easy to let go after using tools (What is value?) (Natural 5S)	When tightening process is completed, an operator can let the tool go and tool will go back to the original position automatically
	Chaku-Chaku for tools (Automatic tightening, automatic return) (During tightening process, actual tightening is done by the tool and the operator only supports the tool to be in position)	When an operator set up tightening tools into the position, he can be away from that process and start to assemble next part. The tool which has been set for tightening recognizes completion of process and automatically return back to original position. Example Multi-nut runner for the assembly process of the tire line
	Kaizen from Commercial tool to Professional tool (A commercial tool is modified by good idea, then it becomes professional tool which is operator friendly)	<u>Step to make a commercial tool into a professional tool</u> Ⅰ:Observe the way operator is processing and find out where the difficulty lies Ⅱ:Modify tool to make a process-appropriate professional tool …. commercial tool is not good enough Ⅲ:when good professional tool is created, try to make it easy to let go Ⅳ: A professional tool should be registered as a standard tool of the company.

3	One Grip concept	During assembly operation, once an operator grips a tool and/or a part, he should never need to change grip position in order to use them.
	Guide function (DFA) <Concept> 1, Ball through the tight hole  2, Shaft through the tight groove 	<Blind process concept> **Guide function of Bolt and Screw**  **Guide function** **Guide function of the shaft inserts a tight hole**  **Guide function** IF $d^{\phi} = D^{\phi} - 0.0002 \sim 3$ in Guide: $d_1^{\phi} = d^{\phi} - 0.002 \sim 3$ in

	No Grip concept (Eye close concept) < Key word：Guide function (DFA)>	Tools and parts should flow into the assembly position of main component without hand grip. 
	Throw in assembly for large part (No hoist concept) (Blind process concept) (Guide function (DFA))	 Air tank assembly to the frame can be conducted at the same height as it was processed on sub-assembly line (throw in assembly)

4	*Okosama-lunch (Kid's lunch menu) …parts necessary to make one piece of product are picked and various parts are put into one container *Makunouchi Bento (Japanese variety box lunch) …set number s of the same parts are picked and put into one container Small amount(only the quantity needed to make one piece of product) of various foods (parts) are put into the one container Okosama –lunch Makunouchi Bento	Separation of pick up process and assembly process Pick up process….should be assigned to the knowledgeable operator. Assembly process….beginner (relatively less knowledgeable operator) One set of parts necessary for one operator to work on one piece of product is picked and handed to the operator in the line……mainly medium and small parts.  Small amount(only the quantity needed to make one piece of product) of various foods (parts) are put into the one container
	Sequence point of use tools, parts, information	For the assembly and another operations, the tool, parts, and information should be laid out according to the operation sequence. (No hand spaghetti, No eye spaghetti)

5	JIDOUKA (Autonomation) Automation with human Pokayoke (mistake proof)	System that every operator in assembly line has stop button and when operator feels he cannot continue standard work, he is allowed to press button to stop assembly line What is the situation that an operator cannot continue his standard work? *Feels risk of making quality problem(or already quality problem occurred) *Cannot carry standard work within takt time *Cannot follow his standard work procedure