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supply.嗯，好，那下面呢？这个呃，这个部分呢？是我们的跟有关生产的一些呃，这个具体的流程对吧？然后呢？上面的部分呢？主要是我们包括。呃，它整个计划呀，包括我们的这个呃，对对我们的流程的控制，这边对吧？呃，那我们可以看到我的这个呃，供应商呃wara对吧？他是给我提供。这个钢呃，这个我不会不锈钢卷儿的，对吧？它是每周二和周四呢，它会来呃送一趟货对吧？周二送一趟，周四送一趟，然后呢？那我的这个整个生产的计划呢？是根据我的呃，这个production plan对吧？每周呢都会进行一个更新啊，这个从我的中心这边production plan到我的五个这个不同的。呃，下面的具体的生产的呃步骤对吧？我都会跟他进行一个信息的呃，这个交流，那我们最后的呃货物对吧？从就是说我们的这个发货方呢？到我们的。在克隆的客户对吧？然后是每天都会给他发货嗯。and of course they have fixed the number of pieces every day. so that's nine hundred twenty,so we have to make sure that this is available,but it is from that point of view,not clear which pieces it is only set the whole amount.so we have a flow of pieces. we don't know how many,but because what we see is that we have two pieces,I think we have mentioned this right from the beginning.um,yes,left and right. yeah,we are producing er left and right a piece maybe for a car.for left steering and right steering,something like that and um,but we at that point here we don't know how many pieces of which fraction we only know.that in between,we always have certain um buffer filling degrees with different type iss.and yeah,this is when we run through the system,May be a situation of the moment when we look into them and we are trying to analyze a factory.in the moment when we pass by then,we see eventually the seamounts in the buffers,but they are not necessarily representative they can.here we have AH,maybe one sort of rand,two sort of LM. here it is,the yad little bit the same.but it needn't two feet like that,so that this can be and can depend on certain circumstances.好的，那我们呃看到啊，就是呃，这边呢，我从我们的供应商呃，他是呃，每天给我大概运。我这边出来是五，每天是用五个钢卷儿，对吧？然后呢？呃，我的这个呃呃，完完了以后呢？就是呃，成品呢？是每天送到我的这个在克隆的客户，是每天送920。件儿成品对吧？但是呢，这个具体因为我们如果还记得的话，它的题干里面呃，我这家呃公司是生产就是呃，我的结构件儿是给金属呃，这个。这车的这个零部件对吧？它呃供给呃供给那个左舵或右舵车的那呃这个总数920件儿，每天呢，它这个里面我们并不是很清楚啊，有多少是左舵的，有多少是？是又多的那只有在这个呃，具体的生产环节里面对吧，我们这边的传送带上啊，这个buffer上大家可以看到啊，就是比如说这儿有1100个是左舵车的600。个是给右舵车的，这边一千六八百五对吧？差不多都是呃左舵三分之二，右舵三分之一这样子。on now,the customer himself on one side,he asks for nine hundred and twenty pieces for maybe for the design of the capacities.but he also gives a daily information about what he wants to produce maybe next day,so he has in principal two forecasting concepts,one is.the forecasting ninety days before production,then sixty days before production and thirty days before production.t.啥意思啊？information about his requirements and daily because because of some changes which can happen,he has to adjust this eventually daily and of course it will fit somehow to this.thirty or sixty or ninety days before and the same we do for our supplier here,our supplier gets six weeks before er six weeks with when we talk about.there maybe er working on five days. these are thirty days,so this is then the minimum here er we give him erer.er of a ing and of course er once a week,we also adjust our forecaster and.according to that,he has to deliver corresponding materials. however,mostly these materials are not.t not devoted either to rl orr,they are maybe type of qualities or other.t other type of deliveries,but in the end we would just have to adjust the numbers. let's say five steer cords eventually,sometimes six,eventually sometimes four.so this is this adjustment happens from this point of view and production planning on the other side is duly for all the machines here a weekly plan.er,but is on the other side giving this er plan to all the to all the workstations,and then they know what to do during the coming week.although we know that there is a daily demand and we have to adjust our production daily as well.好的，那我们这个呃，另外的一个这个这边我们之前也跟大家说过，对吧？这个像闪电形状的，那就是我们呃。这个通过电子邮件啊，等等的这种呃，这个elect al information对吧？呃，传过来的，那我们这边呢？呃，从我的客户克隆的客户这边呢？他每天都会给我一个update对吧？有有一个更新。啊，那因为我这边呢，也是每天啊，会给它供货，那另外呢，它还会给我提供一个呃，它30天60天和90天的，这个需要的产量的一个预估，对吧？啊，那这样子呢？呃，让我能够进一步的去完善我的这个production plan呃，那呃，根据我的这个预估呢，我就可以做我的weekly plan，但是呢呃，具体的比如说你每天。呃呃，具体要生产多少个？但也根据我们客户这边过来的啊，每日的一个更新的情况，我还可以对它进行一个调整，对吧？那同样的呢，我呢把呃我。我这个公司的这个生产状况呢，也告诉我的这个呃供应商对吧？那我会给他每每周都会update一下，然后呢，我也会给他一个六周的一个预计对吧就是。呃，这个未来六周我需要多少量的预计，所以说呢，当他给我送货的时候，呃，也会来看，对吧？就比如说我这边产线上呃，平均大概是每天需要五个。呃，用用掉五个呃，这个钢轴的呃，这个不锈钢卷轴的这个量对吧？原材料那有可能呢？今天多一点对吧？明天少一点呃，有呃，今天用六个，明天用四个，这个也是很正常的，对吧？那我也会根据这个量的调整去把这个相关的信息给给到我的供应商，那让我的这个产线上呢啊，它这个具体的需求对吧，跟我们。呃，这个呃克隆的客户，他给我一个信息，然后我再呃这个做production plan，那其实这边就是我们的一个所谓的这个推对吧？就是这个呃push principle，那我根据客户的订单来制定。具体的生产规划。yeah,then the nominal conditions er the west start with a draught of a stream.eh and the performance of an value stream mapping is eh well what we when we do a value stream analysis. we look for the product line which has to be chosen.we have to select it,then we look for the current status and then we took look for the nominal conditions. this is a let's say.a realistic planning of opti miz optimizing the the existing planning and of course once we have several.conditions we finally decide how to do in the future the work,but when we have done the current status,we try to identify.wicked points.so and the performance of UN valument stream mapping has to be done,and of course criticised and improved.always keep the nominal condition plotting on hand,this means we are doing a plan,but we should always keep in mind what was our.a planning our nominal idea and then of course seventy percent and constantly find this means.we can adjust our nominal plan condition,plan of course that's not the problem,but we should stick to a certain extent also to that so seventy percent should stay.but we should be able to adjust because the reality this is one of the big problems of our factories nobody knows exactly how our factory is running and therefore.uh,we are have to,uh,uh,adjust our,our plans to to to.yet these conditions to these uh daily problems in principle,then we have material information streams,we have to look for them,adjust them as well.and foundation of your workmen like the layout of a house. so this is the base for the further improvements.好的，那我们看到啊，就是呃，这个上节课其实也已经跟大家分享过，就是关于我们的呃，这个呃，怎么来做呃，这个呃values 9 analyze的几个步骤，首先呢，我们。我们要选择一条有代表性的production line，对吧？然后呢？我们要来根据这个现状来画画一下我们的这个现状图那呢？呃，根据我们的这个现状呢啊，那我就要来开始进行。这个呃优化对吧？我比如说找到它中间的弱点啊，或者说是它这个呃，这个产线中啊，我看到到的问题对吧，然后呢，根据这个标称条件就是我想要改善的目标呢？进行啊，持续不断的这个re fine对吧？那我们这边呢啊，也是说了这个上节课的时候也跟大家分享过啊，像我们这个为什么老师说用铅笔对吧？去画这个。呃，value stream analyze的图就是因为你其实是要去不断的去磨这个不断去改善，对吧？每每一个细节都要再去呃。呃，看一遍对吧？这个不断不断的去完善它，这个最后能够达到符合我的标称条件，那包括呢？呃，就是那这边就是always keep the nominal condition。point呃plotting on hand就是说我脑子里心里要有杆秤，对吧？这是我的标准条件是什么？那我的现状又是什么？然后呢？我就希望呢？我现现状能够呃越来越呃优化能够能。改进对吧？能够接近于我的标准调节，所以说呢，我们这个要做了一个constant refine，那然后呢？呃，接下来呢？就是我要清楚我的整个的物料流和信息流，对吧？它这个。互相之间的这个传递，包括它们的周期啊，它怎么互相之间的关系啊，对吧？它跑的量是多少？等等的那呃，最后呢？就是我们也要对我的整个的这个。啊，它就是我的一个这个工作计划的一个基础，对吧？一个啊，就是最后呢，我们才会这个启动我的项目，那它这个呃呃。balance呢它啊，就像这边最后说的，它是我们后面工作计划的基础，就像我们如果要造一个房子，我需要先画一个这个雷奥的图是一个道理的嗯。but er so we starter with a with the first draft of our plan and then review this based on existing step in machine.er,we can relocate er machines. we can combine them,we can erase er er inbetween steps. er,we play smaller.play small sources we we can't change nearly everything but and this is the big challenge there is a problem.and I step to the next one we have. we are having always kind of an ideal status we would like to organize our production according to the ideal situation.but er the reality is always somehow limiting US,and we therefore we can only develop two to three nominal alternatives.none of them is best,but we have to try to figure out how to come as close as possible to an ideal status status.嗯，好的，那我们呃，这个呃，就是来做这个所谓的no nominal plotting对吧？我就根据我的标称条件，我要去靠近它。那我们呢？呃，首先呢？呃，就要看啊，就是我们呃，现有的这些啊，包括我们的机器啊，或者说是我现在的这个状况是。怎么样的？对吧啊？我要先去呃分析一下这个现状，那根据我们的这个现状呢？呃，我要呃呀呃give my right？呃，根据我的现状呢，我们呃来找呃几个，这个就是然然后我看我的这个标称条件是什么？对吧？标称条件是什么？我们一般会有两到三个。选择就是呃去达到我最终的呃，这个理想的状态，也就是说啊，我并不是就是说改改善，或者说是我从现状呃，然后呢，以我的标称条件作为一个标杆，对吧，我去达到。但是呢，并不是说呃呃，这个只有一条路可走，对吧？他可能也可以呃，有两到三种不同的预选方案，对吧？那我要选择一条比较合适的，或者说是哎，我要考虑的。是成本啊，还是怎么样？然后呢？最终能够达到我的ideal的status就是我的理想的这个情况嗯。now the focus is on lead times,what does it mean? lead times,we want to know how we can shorten the timeline,how we can shorten the time.the products are in the factory,so we want and you've seen this. it is quite simple when we have say we have lead time of twenty three days and we operate only.ros leys,yeah,let's say best four minutes. eh,there is a big difference,and how can we this,or how can we improve our situation in order to.get the products faster through our factory.and the reason is clear,because when we are fast getting them faster through the system,the earlier we will get money from the customer.and then we are more operational in case we need we a long time. then we have a lot of pieces in the factory waiting for processing.and in the end,it is bin ded capital. it is capital which cannot work,it is just standing there waiting for.yeah,for the next activity,and that's the the therefore the focus is on lead times in order also to besides the profit.also,to reduce and the fixed capital which then can be inverted in other productions.好的，那我们呃根据啊，前面我们自己做的呃，这个啊，就是前面我们案例里面这个我们可以看到它的真正的process time，是不是只有三分钟对吧？188秒。然后呢？但是它的整个的lead time却有20几天，对吧？却有这个二十三点六天，那我们呢？所以说呢，在呃，这个整个的优化的过程中。呃，我们实际上呢？呃，最重要的或者说是我们的一个很关键的一个点呢，就是来优化我的这个。这个对吧，整个的交货时间，或者说我们全流程的时间那呃，因为每个工序呢呃，只允许呃，这个生产下一个序列所需的产品，对吧？所以说呢，在我们呃，包括这个工厂内的所有工作呢，它的总的目标就是来不断的缩短我的交货时间，也就是说从我的呃这个订单下下来到我能够赚到钱。它的这个时间，我们把它称之为lead time，对吧？那它呢？呃，这个very creating time 1般是以呃，这个分钟来记的啊，然后呢？呃，但是它很多lead time就是可能交付时间是。啊wix对吧？那我们啊上节课也给大家说过这个to ota，当时提出精益生产的这个啊这个ono啊，这人也很有名，它就是说我们的。整个的目标就是来呃，缩短这个时间轴对吧？就是等于说我下订单到我能够拿到钱，这个时间我尽量去缩短它。um,another point which is,uh,let's say critical when we look into the factories,although we plan in an ideal sense.eh,we see that there is a lot of waste er,but what is waste er? it's a Japanese word er or the Japanese use. this word waste for mood a.or and of what they mean is useless operation or useless activities er which are not creating.er value ander waste from that point of view cost diamond money and what they want to know to.to do is get out of the waste in the production,so this is on the other side waste is not by purpose,it is a symptom.er,and it is,there is a reason there is a problem mostly,but that therefore we have. let's say we are losing time,we are losing money.um so thy waste shows problems inside the value stream and we have to find the reasons for that and we have to get rid of them.嗯，好的，那我们这个上一节课也给大家说过，对吧？就是我们的精益生产里面经常来提到的啊，这个呃叫呃muda对吧？这个日语里面的浪费的意思。那这个浪费呢，它就包括呃，这个它这边定义的就是我们所谓的浪费，就是没有呃创造任何价值的部分，对吧？就像刚才我们利泰里面。它只有这个三三分多钟，它是真正的在创造价值的，然后余下的时间实际上就是一个浪费的时间，对吧？那这个waste呢，也包括我们所谓的。时间和金钱这两方面嗯，那我们现在呃上节课也给大家大概说了对吧？他对waste有三个所谓的key point。啊，那第一个呢？就是这个浪费它更多的是问题的这个症状，而不是原因，对吧啊？就是它是一种表现症症表现出来的症状，但并不是它的原因。那第二个呢？就是说我们呃，这些waste或者说我们的浪费呢？就是表示表表明了呢，我们的价值流内部是存在着问题的。那第三个呢？我们就必须得找到浪费的原因，就产生这个浪费的原因，并且呢，去除它们或消除它们嗯。oh,what a waste.well,the yer in the literature when we look into the Japanese,it was a statement which was done by taichi oh no.who was a production twitter production chief of the world war ii and.and who has,uh,who has? let's say,um,develop the philosophy. weh,we are having here.and so they identified so called seven types of waste. and yeah,we can.mostly we can understand what is happening here,maybe they are otherwise s,but these are the major parts of waste.嗯，这样嗯，好的，这个上节课我也给大家讲过，对吧？这个呃。这个所谓的seven muda对吧？七个七个这个浪费，那这个是由啊，这个塔伊塔呃，这个叫塔伊奇乌no啊，就大野奈伊这个日本人呃，这也是。就是我们那个丰田的生产总监啊，他提出来的呃，关于经营生产里面的。七个呃，这个浪费对吧？那我们上节课也给大家大概讲过了这个呃，哪里几个方面会产生不同类型的浪费？yeah and,now we go through these seven classes. the first one is handling,handling can be that we have machines which are too big,they have been bought,but they do not fit to our process.er,they are eventually missing some er technical equipment,so we have to do more humans have to make manual operation.er handling can be also set up times,it. can be also cleaning cleaning of buffers cleaning of the machine and so on.handling is er something which is not contributing to the value of the product it is just an operation in the factory.嗯，好的，那第一块呢？就是在我们的啊，所谓handling过程中产生的啊，这些位置hu PS let's my english呃exactly for you。OK，OK，等。so and then we find a other prose like overproduction scrap waiting time transport movement and inventory just to remind you.that these are the seven key elements of the waste？好，那我们这个因为我上节课已经给大家讲完过了啊，就是我们七种类型的浪费，包括在。呃，这个呃，处理过程中对吧？然后包括一些这个积压的货物，对吧？库存，然后呢？overproduction就是过度生产，然后呢？在。另外呢，还有一些movement，就比如说是呃，一些从一个地方到另外一个地方，它不必要的一些移动，对吧？然后呢，另外呢，就比如说我们的scrap scrap，就是我们如果是。啊，产生了各种各样的啊，这个问题或者说是浪费了时间也好，这个就是浪费了一些工作，对吧啊，另外呢，我们的在transport过程中，然后呢？还有一些危危停产，对吧？等待的时间，那这个呢？就是欺诈类的这个浪费。now er,what are elements er or guidelines? let's say to improve the value stream,what can we do in order to make production more efficient?and it starts with a very central point,and it is the so called customer cycle time. the customer cycle time.is the available operation time per shift,so the time will not we have capacities available.but also the customer requirement per shifts,so when we have a twenty seven thousand,six hundred seconds,this is seven hours and forty minutes.eh and we have to produce four hundred sixty pieces per shift. this means we have to produce every sixty seconds,so every minute a piece.嗯，好的，那我们呢？就是呃，关于呃，前面也说了，对吧？就是如何去做这个优化呃，那我们呢？有这些有一些这个指导意见，对吧？首先呢，我们来看的一个要素呢，就是这个啊，客户的所谓的custom circle time，那我们的这个custom circle time呢，是用啊，就是我们这个啊，比如说是一个。一般对吧，就是我们呃，这个一般来说这个一般制两班制对吧？两班倒那那我们就是per shift一个班次它。它能够生产的呃呃，这个呃，这量对吧？或者说是我们消费者他定的需要的这个量呃。那和和我们的这个它生产它这些呃物件儿所需要的总的时间啊，做一个呃这个对比对吧，那我们比如说呢，我现在一一个班次，我生产了460。呃，物品对吧？或产品他用了27600秒，那我就说呢，就是60秒就用27600去除以呃460。now,what does it mean? sixty seconds,psych er tine I step back to our initial plan,and when we see,we have here eh ya five or six machines.this means every minute AA piece has to move from one place to another one. this is the psych er ton.er so,with all the time losses in between er but in average every minute a piece,this in the end delivers finally.if it's for the shift half of a shift which is four hundred.sixty ander if we have,we see the complete day. it's nine hundred twenty.嗯，好的，那我们刚才算出来的这个呃，所谓的customer。这个含义是什么呢？就是我们在呃整个的这个呃生产的这个过程对吧？我们所所有的有效的这些步骤加起来的时间对吧？就是这个所谓的。啊，我们这边的啊，多少个seconds对吧？是真正用于啊生产的时间，或者说用于创造价值的时间。and AH,yeah,once we know that we also can look,how is the time in the different? uh,production steps.we have here seven seconds,so here we have put seven seconds. then we look into the different other.er process steps,and here we see er this needs nine seconds er ya,and so we see which psyche is here the most critical.it is the most slowest one,so here every nine seconds we can produce a hahaha a piece.er,and this is er,then our limiting factor,which?on one side has to make sure that this machine which is doing this is all the time busy because all the other machines have er gown.they still have sufficient capacity left in order to catch up in case they havey break break downs or.are waiting times.嗯，好的，那我们也来看一下啊，在整个的这个。呃呃，整个的呃，我们所说的这个过程对吧？全流程中的呃，这个custom circle time呢？也是我们这个很关键的一个参数，对吧？很关键的一个参数。啊那呃客户的周期时间呢啊，是给就是解释适合客户要求啊，可以呃动用的产能的一个啊，我们可以说是它是一个。很好的一个工具，对吧？去来给客户解释啊那啊，像我们在这个啊步骤里面啊，我们啊可以看到这个是circle time a process for each resource，对吧？就是我们在做每一步的。这个工序中我是需要的不同的，这个circle探对吧啊？那我们呢？也可以在这个具体的分析中对吧？在这个value stream这个图在我们的在分析中呢？我们可以看到诶。啊，我哪里哪个步骤啊？它需要的circle time是比较占用时间是比较多的，对吧？我哪里是可以优化的啊？这个都可以通过啊，这个去做custom搜探的分析呢，能够呃一目了然，对吧？那我也可以针对性的把这个时间上的浪费，或者说把相应的问题给找出来，然后呢，加以改进。another point is constant flow what we normally do in the factories is we produce on a machine and we have a box take pieces out process them and put them into an empty box.so er once the box is empty,we move this and this. this box is empty and this box is full,we move the full box to the next machine.process here again,all the pieces and once this box is full,of course we have to provide an empty box.er,then we go to the next step and process the same. this means we are producing here ten minutes,then the box is moved here,maybe after a while after a small showed waiting and transport time.it is processed again ten minutes and then it is processed again ten minutes.this is the lot and batch processing which is very long because it needs a minimum thirty minutes to go through.嗯，好的，那我们啊，前面啊，第一个就是我们也也说到了，我做这个value stream的分析呢，主要是让我的这个啊performance对吧，我的这个整个的。嗯，表现能够提高，那我们这个六个get line里面第一点是customer circle time对吧？customer circle time就是客户周期时间。啊，那它呢？主要是让我的这个生产节奏和销售节奏能够同步，对吧？包括我的这个是基于我的销售啊的这个节奏来。呃，制定我的这个生产的呃，这个规规划的节奏率，那第二个get line我的第二条的呃，大的标准呢就是我们的呃，所谓的constant。flow那在我们这个第二个指导意见对吧？也是我们精益生产的第二个指导意见，我们所谓的持续的flow，那我们首先要看一个比较老的，我们叫这个批量和批次处理，对吧？processing也就是说，在我们以前比较传统的生产啊，就比如说我现在要生产呃这个呃呃。这个物品对吧？我有三个工序process ABC，那它首先呢？哎，这个原材料进来到process a生产完了以后放到旁边对吧？这个有一个。呃，有一个buffer，比如说有一个这个呃，中间存储的这么一个箱子，对吧？然后呢？我生产十分钟以后呢？再把这这个箱子装满了，我再把这个箱子放到下一个步骤，对吧？进这个process b。然后呢？我在b里面生产十分钟，然后这箱子又满了，我再把这个箱子放到c这儿对吧？那我们这个lot ten batch processing它的这个问题对吧？它一定要等到上一个步骤完成了，我才进行。下一步骤，那我们这么来看这个步骤，每个步骤需要十分钟，也就是说我整个的这个要生产完这一批次的呃物件儿，我至少也得30分钟。是吧so the option would be to put all the machines in a row and to produce the first piece here。then it brings to the next plea machine,then to the next machine,and while we are putting a piece to the next machine,we also can already put the next one into this.yeah,it depends when we start with the black,so we start May beer with the black. then we continue with the black over here,then we continue with the black over here.ye aan der we have to make sure that no,we have three. so first,the blacker then.it is operated here a SB and then it is operated here as cso after three minutes.let's say after three minutes the first piece is here and then put into this box and we are constantly producing.and when we are producing like that,we need only ya the ten ten minutes plus.the additional two minutes to go through the different processes to start a little bit earlier to start than the two machines have nothing to do in the beginning.at the end,the two other machines are waiting until the last process has been finished,but in the end we need only twelve minutes to do this operation.嗯，好的，那我们来看啊，第二种方案，我们叫它continuous flow对吧？那跟前面一种批次批量生产的区别，那是就是我们上一个，就比如说我们这一批次一共有二四六。80个货对吧？那它都是等到这个十个货都完成了过程a我才进过程b对吧？然后呢？呃，过程b的这个或者说流程b完成以后再进流程c，那我这边的continuous flow呢？就打破了。它的这个一个批次完成，我才能进入下一个序列，而是我这边也不需要中间的这个buffer了，对吧？我就直接。哎，这个我第一个货对吧？从原材料进process a，然后呢？第一呃，这个第一件儿完成了对吧？这个从a这个完成了，我就直接进process b对吧？那我这边就是呃，跟他这边只差了一个对吧，然后b这边完成了呢啊，我就直接进c了对吧，所以说呢呃，那我这儿呃，如果说是每一件都。呃，这个每一个这个步骤，我比如说是一个一个工呃，一件儿货，一一件儿的处理速度是呃，十分钟，那就是单件的话是一分钟的处理时间，那我看到啊，这边我总。所需要的总时间就11分钟就可以了，对吧？11分钟就可以了，或者说诶，12分钟12分钟就可以了，那呃，因为我这个呃一个物品生产完，我就第二个就接上对吧？然后呢？啊在在在这个等就没有所谓这个等待时间，对吧？那我啊这个啊，每个机器实际上就一直在不断的工作啊好吧啊，它没有这个空闲的等待时间，它就是等到上一步完成了。我就呃，下一步就接上了，对吧？这其实是啊j sequence的这个呃生产方法。and we just only put the pieces,the box,the pieces into only once into boxes were move here and put them here here. we have three times the same operation.so we reduce it to one time. and this is an advantage.好，另外的一个嗯，改变呢，就是我中间的这些呃，这个buffer对吧？也都不需要了，然后呢？它这边其实是分了三个步骤，那我其实现在是把它合到一起了，对吧？啊，这个包括在地方上以及在流程上都进行了优化。OK，so we make break here。嗯，好，那我们休息五分钟。the gooder did faggestnotarchrevite come there bye rish ber again,it is ao aer modern mahin.平凡。I get it why he won't look like this。we are shown the white one，but we are talking to the white one，嗯，延安。it's by there. then it helps all exactly to bash Bill when we're in shenanigan,we're all no MA.t.yaya Vietnam star UN patched e claus oy ette s as dantes blu bus MA ha BA zi na tu rik na kha VI ch CHI flange har.and then then be of the sea team extra I gain would have yas,yas,yas ya veined to be thou'st asked ig litt and besser.somehow,as to Diana klein AK took a hold of the ti shed little dental.呀呀，来的呵呵呵，I'm agit snore yeah yeah，it's it's canch bah i've a tossing my hurts，that's all。t.nbsp nbsp nbsp nbsp nbsp nbsp nbsp nbsp nbsp nbsp nbsp nbsp nbsp nbsp nbsp nbsp nbsp.ill and fermented Vietnam,and that so and their tone is against gonzalez and bishop under Switzerland.为斯马克斯都登摩根，为伊些格拉伯哈耶特昆维尔迪的佛连熊弗提西蛮好的。亚当哥对我也爱蛮横。OK,it's been many see here of the right. it is a fool in break mankin,it's been as consigned as we're born and then shake stand dia of out,then fall into me.I.罗奥的PDF。do hasting fabric plano na ut neri manu vast ou ya?啊。mystic ity help her here harm.嗯，这是20厘米40秒。eh,the hapt yo he is here swirl ty i can reach the habit ion of hin on. this is a verma pu meh.t.ump a sant or assured of he first ya feel like some way off too too long some ya these ya'a make deh.Emma eldest is a cronkite demanding so kind.t.was i can ling no swearing contract to to the one guy cricket I see elmie had as he fascinated as he had?嗯。but was his tiding,the songs eber shaft is seur ber shaft is seur yarned not really. he vowed Emma it was.混音。erring with him formats unu d,so I had ess is vvii ya huh and had my many sight on fagg is慢reader ahh,then when it seems I in fact where I found viny formats unu d he resettled on.萨克威克逊肯。说iPhone也是来哪里？嗯，一些麦克风的识一下，别吃吗？安卓。t.嗯嗯。嗯，还不满意我的。北京美利亚。oh Philip,I'm said the maids of an UN fortune application.powerpoint in narcotics for an exper s hiked by the woody email policy felix AH,it's globous to go slush yet. I'm uh,can't I'm uh,can I'm uh,can't I'm abi ni sia?powerpoint is only PDF.t.but this good afternoon.let's get transactions in the.whereas has two auschwitz fer or na hawk aladdin er,where there is our videos on so Chad in ery thoughts tei ni sim MA BI do ED by the mal habit sun ter ho ni.问你妈，你好意思问这？he must needs logan of who was how,if he think DV indicts in that's vice,there in voice er ha ha she LA d him before he had a fear or a filthy vigilant of zoom.they're so famous as kite,yeah,do we just clubs to come as a happier etched fabric plano cre phony? and he laughed at his direct talked amidst er.amid his frags er,but he now has offered los moss for the he affiliated mobility did CON guess em by US entitled ambit ian.I'm.左耳艾雷提。嗯。do hussy,it's on the inde na fabric plan. no honour hon't AH AH bah,it's no a pit if only no,and p pti skin door na na.nana,who was raw in the DAS,is in an ard on a raw ZA KO k.你看他们说的话，你去给医院吧。m Oslo bit her yes imitionsd and an.as我干嘛喝？啊哈，还不是个人路丰丰路丰丰富啊。三两一那。OK，so AA嗯，OK。特别是你穿白皮裤子。as otyppt呢？t.hey done and it gets my done.嗯。the I wanted to mention before going to next slide also that this concept it looks to be very efficient,very fast.but it has also a lot of disadvantages. one of the disadvantages is er when one of the machines is broken is stopping.because process has problem,then all machines wait here in this concept,the individual machines.are not er are working independent,so we can eventually have avoider.um back and forth problems.but once this is a problem,then all the others can continue to work here. it everything stops almost immediately.another problem is we have to have to make sure that all the machines or all the products we are having here are produced the same way.so if there are some products which are only needing process aor others only process cor others only process bso in case of sums.specific productions we cannot use this because then all the other machines are doing nothing in this time,they are running maybe the pieces are running through without processing.and then so we lose kind of flexibility in terms of er yeah different products,which can be produced on the machines here the machines in the upper PLA case.machines can be used freely for different types of productions,and yeah,so it is not necessarily the best option it is only under certain circumstances,the best option.好的，那我们来看到啊，就是这。这个呃a和b两种不同的，一个是批量生产对吧？一个是我们这个continuous flow对吧？它这个连续生产，那它们两种呢？也是各有优缺点，那呃简单的来说呢？就是呃下面的这个continuous flow呢？基本上你的啊，每个产品对吧，从它从原材料到我出来以后呢啊，那我基本上我的生产节奏和我的这个生产的工序呃，基本上是要相同的就。就比如啊，你每个产品都是先过a，再过b，再过c，对吧？这个顺序也是要一致的啊，我就不可以说唉，我先是啊，比如说是完成啊，这个先做a，再做c，再做b，那这样就不行了，对吧？那第二个呢？就比如说呃，我们有的呃，这个步骤比如说呃，我只需要比如说a呃ABC啊，我就呃，现在具体来比如说是a是车床b是。啊磨床啊c是现床好比说啊，那我如果说一定是按照呃先先磨在这个先先做车床再磨呃再磨再洗的这个顺序来说呢？是OK的对吧？但是如果我比如说我只要车一下，其他我就不需要，那我这个呃就是呃上面这个呃方案就比较灵活了，对吧？或者说我只用a和c的步骤，我不需要b。对吧，那我下面这个呃，这个呃continuous flow就没法处理了，对吧？就是呃，比如说是呃，它中间有一个环节，我不需要，或者说我只需要其其中的一两个工序。那呃，相对来说呢，这个呃，上面的这个生产方式呢，它这自由度就比较高一点啊，那下面这个生产方式呢啊，它呢，对比如说我的这个整个占地面积啊，包括我的。呃，时间上那它就是更优化嗯。now the next point,which is a is the so called feeful systems that's coupling the proof several processes in a continuous production line. in principle,we are doing this here as well.without without buffering inbetween,but here we are putting connecting two workplaces or two machines with a with a yard transporting belt maybe.and they are processing accords according to the fee for first in first out struck. and this is then connecting them in a strict way.and by having this conveyor in between,we have kind of buffer in between. so when there is a problem in on the right side,we have not immediately a consequence on the left side.嗯，好的，那我们第三条的指导意见呢？是这个所谓的fifo l system对吧？fi sen fist or sor sor那这个fifol的概念呢？我们之前在呃上学期的另外的课里面也给大家讲过，对吧？这个是一个比较经典的。点的就是啊，我啊先先到的对吧？先生产那像上一个get line two的时候，我们这个continuous process，那它本质上就是一个fifo就把啊先进来，然后再就是。整个连续生产，然后呢啊，一个接一个对吧啊，排着队向下的，那在我们这个连续的生产线中呢，它是偶合了多个工序的。那在当一件产品完成后呢？它的这个后续的工序呢？就会向前一个工序发呃，这个释放一个信号对吧？就是我这边完成了，你后面一个好进来了，对吧？所以说呢？它这边比如说是呃，前一个工序和后一个工序之间呢，一般就是用传送带对吧？进行这样子的一个链接，然后呢，它可以啊这个啊。这么呃，有一个f track对吧？一个一个一个一个排队的进入下一个工序。what is described here with this release signal means that we can er fill this buffer,but er every time we take something we can send a signal.to this machine,please produce next one so that we can install something like a link between the different operations and with this we can keep the.the inventory levels or the working process on this on this,let's say,track a constant.eh？so that's a beautiful way，how to how to self control in principal production systems。嗯，好的，那我们呃，前面也是说啊，就是前一个工序和后一个工序之间呢它。这个不管你是用传送带还是什么方式，连连接起来对吧？它这个fi foot那我们就是在这条啊，传送带上一个一个这样子去排队，那我这边呢？啊，比如说啊，下一个工序取用了一个件儿，对吧？就是把这个啊，这个键取用掉了，以后呢，我这边可以发送一个信号，对吧？发送一个信号给上一个工序，说哎，你这边又可以生产一个新的，那我这边的这列里面一直。排队对吧？每一个啊都可以啊，这个准时的，或者说是按照这个节奏对吧？一个进去再呃，一个天进来，一个进去，一个天进来，那永远保持着这个。节奏对吧？所以说呢，它这边也是说fifo line可以这个达到一个maximal stock level，对吧？这条传送带这个fifo track这条线呢？实际上也是我的一个啊，这个啊，缓存线对吧？那它这条缓存线上呢有？永远是保持着固定的，这个stock对吧？或者说是最大的这个储存量。and then we come to the so called kanban production. well,the kanban is a an interesting concept,because we are producing a.not single pieces we are producing volumes in boxes and the box itself is kind of a lot,and we produce then lot so every time we have a supermarket.and in the supermarket,we put pieces or boxes maybe the different lanes of the supermarket are.representing different products May be and every time we need a piece,we we take the yeah,we consume in principle the kanban.and once the er it is empty,we send it back when we send it back then. the next production steps takes this empty box.ander fills it again and once it is filled,it places it onto a corresponding product ya.buffer place so in the end the kanban is an interaction between two um production facilities,but there is a buffer in between.and this signal we have seen here before this signal for new production is here replaced by a box or a cart.because k慢慢in the end is more a cart,but in many cases it is just the operation done operational by filling boxes or bringing empty boxes and filling trying to fill them in the.嗯，好的，那我们这个第四条get line啊，就是呃，这个也是我们。在精益生产里面，经常听到的一个概念，对吧？我们所谓的看板系统，或者叫我们的这个supermarket啊，就超市的拉动系统，那它这个呃，这个看板，这个概念或者。说我们中间的这个supermarket，我们可以把它理解成是呃，这个中间的一个比呃，就是前后两连接前后两个工序，它中间的一个比较大的一个中转系统，对吧？那像我们上一个。呃，上一个这个get line里面也给大家讲了它这个ci fo的概念，对吧？它这边它会有一个排队，对吧？当下一个呃，这个这个工序我取用了一个键，以后那我给它上一个工序，发一个信号。跟他说哎，你给我补一个对吧？所以能保证保证我的这个，或者说我这条流水线上，它一直能够一个一个一个的跟上，对吧？那我们的。看板的系统，或者说我的这个supermarket系统呢，是在这个基础上呃更完善，或者说是呃。相对来说呢，是这个把这个中间的这条这个沟通系统，或者说它的这个buffer系统呢，把它做的更完善啊，就是我们这边其实有两个看板，第一个呢，就是说我们在。后一个工序对吧？取用取用这个呃，前一个工序取用掉一个以后呢啊，我我这边呢就会跟他说唉，我就要consume一个对吧？就是我要购买你这个从就像我这个去超市一样，对吧？我这边呃，不像上一个，它可能是呃，这个fifo track里面是一个一个一个这样子，那我这边可能要取用的时候，我是取。去用一个box对吧？我这边呃在货架上，我就把一系列的这个后面需要的这个产品我就取掉了，对吧？然后这个盒子一般我们这个看板是。呃，系统里面它比如说这边啊，这个超市系统里面它是一个盒子，然后上面添了一块看板，对吧？上面有信息，就比如说我取用了什么这个呢，我们叫它consumption can板。啊，那个我取用掉了，那同呃同时呢？那我这边这个这边这个超市是这儿这一格子都空掉了，因为被他被他取掉了，对吧？那我这儿要补货，对吧？要补货，所以说呢，我再从。我的supermarket呢？我在呃发一条信息给我的production，这边的这个上一个工序对吧？呃，那这边呢？就叫production看板，就是说呢，你这边要生产新的。来帮我这边空掉的这个位置，你给我补货好吧？呃，是这个逻辑。umm,now the one of the point.besides the fact of the the size of the of the size of the.here is now the pacemaker,the pacemaker is in a production system kind of a bottleneck er and the pacemaker I secale rise calibrated,so we have see.the customer has a has a variety of demands,we don't know exactly sometimes,very much sometimes very low,but the machine which is here or this process which is here.is a limiting factor so what we have to do is to ask all the time for production and don't er produce nothing in case there is no.no little demand,so we have to to e calibrate in principle this very chaotic demand.and and smoothen,this ander feed the paste,make a machine in order to get maximum s rupert of the finished goods which are then put here into a supermarket again.嗯，好的，那我们这个看板系统，它本质上呢？是要来平衡我的这个呃，生产就是比如说我一天生产中的它的这个呃，整个的波动对吧？啊，它的一个震荡，或者说它的波动，那我们呃，我们知道啊，就是从呃客户的角度来说，我的这个订单它实际上是呃震荡这个曲线的震荡是很大的，对吧？那我不可能。呃，这个这比如说它不可能非常平滑的，它还是一会儿可能多一会儿少，那它这个是我们我们说它是这个震荡的频率是很高的，对吧？它是呃，这个呃，相对来说我们呃，在这个生产线上对吧呃，因为我们我们知道我们需要一个这个生产生产线上，它是有一个恒定的产量。量对吧？不能说一会儿高，一会儿低，那这样子你比如说啊，你去转货，或者说是你的这个等待的时间就会变多，对吧？但是生产我们就希望它是一个哎，有节奏比较平稳的，然后。呃，这个周期比较固定的，这么匀质的这个曲线能够光滑一点，能够光滑一点，那我们这边的c呃，这个supermarket呢，实际上就是在中间起了这么一个缓冲的作用。也就是说呢呃，我怎么能够保证呃，这个在我拨云轨绝的这个订单的情况下，能够让我的这个产线对吧啊，我们的这个生产过程中，它这个呃，或者说是生产计划的安排，我能。相对来说，这个是平滑一点的曲线啊，就是不要是一会儿多一会儿少的，那这个呢，就是我们的这个呃supermarket，它起的一个作用就是呃，那我们呢呃，这个超市呢，它的规模的确。要根据我们比如说呃，他的客户需求的波动来呃呃。这个呃，提前预算出我的这个补货的提前期，再加上一个安全库存啊来实现。well,one of the challenges,of course here,is how big should we make this supermarket,this buffer.and on one side,we need the lead time of the replenishment,the time for production. this is an element which is important.but also demand fluctuation. sometimes we ask for a lot,sometimes a little bit,so when we ask a lot,then we should not run empty here,though the supermarkets should still keep some pieces.and we should have something like a safety stock,so we should use this as a as a buffer,a buffer like a machine which is a smoothening in principle.eh,the demand or on one side supplying this very strange,this chaotic demand on the other side.balancing the slow or the limited capacity of the pacemaker，嗯好的，那我们这个呃生产这边我们呃。它是一个就像起搏器一样，对吧？带动我们的整个工厂往前进，那我也是希望啊，我们的这个supermarket对吧？能够起到它平衡每日波动的这么一个作用，那它的这个。超市的规模对吧？我们这个supermarket，它的规模怎么确定呢？就是根据我的呃，这个啊，不断波动的这个呃，客户要求啊，来预估我的这个所谓的。啊，对吧？我要啊啊，这个补货有一个提前期，就比如说如果我的customer demand比较高的时候，那我的supermarket就不能都是空的，对吧？我至少有一些是在这个里面的。啊那啊，包括呢，我们的这个safety stock对吧？我要有一个安全的，这个备货就是当我们要这个，这边突然有单子的时候，我就呃，不用急急忙忙的去。提高我的订单量，而是我先去从supermarket这边调货，对吧？然后呢？我的这边的生产还是可以按照我的计划去恒定的去生产。em then second is constant flow em this means er when we should when we compare our systems we have on one side this.er consent flow here,here we have the fifo sa concept with some intermediate buffers,of course,and.and here we have the super market pool systems. all of them have their specific advantages er,and when we have a very strong,very er.UN flic ts the customers asking very much,then we can of fluctuation sometimes very much,sometimes very low,then this is the best concept.here,this concept is is an enemy of er er uncertainty. here we need a very constant flow,a very clear production.er process and no deviations at all because the capacity of the machines in a row is limited er in case one of the machines already.e stops production because of a breakdown or some some missing,uh uh,yeah,maybe pieces or or tools.嗯，好的，那我们来比较一下啊，就是我们的呃，这个呃，第二条到第四条的这个建议啊，里面呃，第呃get line two呢，我们是叫constant flow对吧，然后它就是。呃，在呃，我们的这个四个工序对吧？它每个都是前后连接生产的，然后呢？呃，中间是无缝链接的，对吧？然后呢？get line three是fifo fifo的话呢？就是它中间会有一个所谓的buffer，对吧？中间有。有一个呃缓存的这个空间那啊，它们呃前面和后面就是我们前面也是说四个步骤里面对吧，就是我啊，我这边通过这个fifo的。呃，这个呃check对吧？呃，连接前后两个工序，那在呃后一个工序要求的时候呢？我就把相应的信息传到前一个步骤，对吧？那我这边有一个呃，这个。信息的传递，那这个get line four就是我的这个supermarket processor，就是我们的超市拉动系统的它呢呃，中间这个supermarket其实也是一个呃，让我这个从计划对吧？因为在。呃，我客户订单它的波动比较大的情况下，呃，能够用supermarket做一个比较好的调试平衡器对吧？然后呢？同样还是用拉动生产的这个方式。呃，去把这个计划和生产能够有一个比较好的转还，对吧？虽然说我的这个呃，实际的这个订单是波动比较大的，但是我的生产计划呢？我还是希望它能够是。比较平滑的来做的那呃，对应这个supermarket system来说，constant flow呢，它要对应的就是一个比较嗯，它的这个客户订单就比如说是比较平滑的，对吧？它的呃量比较恒定的。而不是这种波动大的，那我们一般采用constant flow，因为如果说你的这个呃订单是很不可预期，波动很大的，那我就很难。呃，去做这个constant flow好吧，那我们每一个它的get line呢？它有它自己的特点啊，这边呢也是啊，大家也可以参考一下。well,and this is an intermediate solution where we are er trying to control the working process er,but all of them,all of the seer.er machines are all concepts are trying to control the working process here. the working process is minimum here,it is maximum.er controlled maximum,and here it is somehow in between.嗯，好的嗯，那我们的整个的嗯，这三条我们可以看到它需要的这个processing time d get line two肯定是最短的，对吧？呃四的话相对来说长一点那。呃，三号呃，就是点line three呢，是在中间的。um,we have something like a customer decoupling point. the customer decoupling point is.on one side,we have processes em which are maybe we we have.to what we see here is we have the coupling point in terms of supermarket application and then the customer.and here we have a supermarket,and then we have the decoupling point for afeeful. so when to combine.t.a working processor concepts and this depends on,let's say the.the customer because the customer itself what we have to look is what is the maybe one of the limiting.points and another point is how much time do we have to produce,and here we have more here when this is the decoupling point.then we have to produce this in a certain sequence and needing a certain time,so when the customer wants to get it,the pieces immediately here then he can use it by a supermarket.when the customer on the other side er er wants,he doesn't want,but when the process needs some sometime.er for individualisation,then here the customer needs a certain time and has to accept a certain lead time while here. the lead time can be very short.嗯，好的，那我们这个呃get line 5呢？就是啊，所谓的这个客户要它俩的结偶点啊，就是呃coupling是偶合对吧？decoupling是结偶。解偶或解偶合，那我们也叫它这个pace make process起搏器流程那呃，这个呃，像上面这个呢是呃。我们的这个这一个process，然后跟一个supermarket，然后呢啊一个process，一个supermarket，对吧？这个啊，那这边的这个工序呢，我们这个workflow是可以是。啊，在这边开始解偶对吧？那下面一个呢？实际上就是我的这个process one，然后呢？在这儿就解偶了，然后呢？我后面就是用first conference out fifo的这个。方法了，那一般来说，这两者它的这个取舍就要看你的customer订单是一个急单还是不呃，还是一个就是不是很急的单子，那如果是急单呢，我们一般就是用上面这种方法。如果是啊，不怎么着急呢，我们可以用下面这个流程嗯。i come now to a point which is also very important because when we look into the factories we see that there are some.um,our productions required,so here we have an assembly plan and we want to have pieces. let's say on Monday,on Tuesday,Wednesday,we want to produce on Monday four hundred pieces of.product a and hundred Tuesday hundred pieces of product b in order to keep the capacity a and to keep the capacity,we have three hundred.pieces of product b.on Wednesday,we have two hundred pieces of product band,two hundred pieces of product c,and then on Thursday,four hundred pieces of product c.and on Friday,two hundred pieces of product cand product a it looks very logic because we have every day four hundred pieces.but on the other side,when we look,how many times can we get product BT hen we see product bis produced on Tuesday? and whence and.t Wednesday and the next time product bis produced is the week later.waiting a complete week until Tuesday again,so here with this we have a problem that product be his can only be produced uh while a while it is not produced and then.we have to have buffers which are very big in order to keep the er to provide the product b for the customer.嗯，好的，那我们这边呢？呃，在这个p make process里面呢？我们也要呃给大家，就是提醒一下啊，就是最好呢，就是我们能够用小批量的。生产来平衡我的这个起搏器流程啊，什么意思呢？就是说比如说我现在有一个这个生产的这个装配的订单，对吧？我每周。一呢，是生产400个呃a对吧？每周二呢，是生产100个a三百个b，每周三是生产200个b两百个c，每周四呢，是生产400个c，每周五是生产200个c两百个a。虽然说啊，我们看到这个assembly plan，它每天都是生产400个呃，这个产品对吧？但是呢，它的这个因为产品是不同的。所以说实际上，就比如说像b吧，我只有出现在周二和周三这两天，对吧？一个是300个，一个是200个，然后呢？这个后面都没它试了，对吧？一直。周四周五周六周天一直要回到下周的二，我再要再才能看到这个b又被生产，对吧？那这种呢？实际上这个计划呢？就是做的是不太好的。now it is better than to produce er on Monday some pieces of a and band che re hundred forty a hundred.hundred b hundred sixty c. this means in the end we have again four hundred pieces,but we produce everyday every.or every part，every day。嗯，好的，那我怎么来优化呢？就是我不要按照像上面的这种assembly plan，就比如说礼拜一只生产a或者怎么样，对吧？而是我每天都平均ABC都生产一点。啊，而不是说是呃，这个呃，某一个产品要隔好久好久才生产第二次，对吧？这个我们要把这个生产线，它就是每天都生产一点，那同样我们礼拜一是生产400个件儿。那我这个把它平均分配一下，对吧？就是呃，生产140个a一百个b和160个c，然后呢？每天都生产这个量嗯。eh and it would be even better that when we are sending two times trucks to our customer,we even split this into two parts,so we say fifty b.a seventy a and eighty c,so that's half of that. and again,we have er all the pieces er er provided herein one truck.and in the second shift,we also do the same. so every piece to each delivery,every that's a delivery window.读音一对吧？一会儿呃呃，这个a要生产好多。是完全就没有了。那呃，这个。halloo to pist match mal wick ish ping wick OK ahs hhs could i do bis wick OK ye hi she gone yeh.好的，那我们这个刚才说到啊，就是呃，这个不同的生产方法，它的这个原始的是。呃，最不好的对吧？它就是呃ABC，它有时候呃a要生产很多，有时候BC是完全没有，对吧？那我就最好的呢，就是每天每一个呃部分我都生产一点，对吧？那啊，这个是我们的这个第一次优化的解决方案，那我可以让它更优化，对吧？更优化的话，就比如说我一天是发两班车，那我可以把这个呃，这个生产的批次把它再。呃，缩小对吧？这是我呃呃，这个一个批次，我就生产50个对吧？每呃生产50个笔呃，它的一半对吧？70个a和80个c，然后呢？这个生产完了，我就一辆车就可以装车走了，对吧？然后呢呃，再生产第二辆车，那我就可以啊啊，这个every piece to each delivery对吧？就是我把每次的这个。呃，这个运送的这个周期呢？作为我的一个时间窗口，那我这边呢？再把我的批量啊，每次生产的批量给呃缩小。yeah,and what we see is that er we are trying to split the lots according to the er into smaller pieces,and we have then good.we change from a tob from BT oa from and so we are very flexible in order to.t to produce the point is why this is not always done in the factories,it is because the setup times might be very large.or very long and therefore we have to concentrate how to reduce setup times when we are changing products.嗯，好的啊，那我们为什么要来做这个呃优化呢？因为实际上呢，我们也知道，就是在生产不同的产品，它会有一个setting time，对吧？就是啊，机器啊，从生产产品a到生产产品b。我要调试一下，对吧？有的时候要清理清理一下，等等的对吧？你如果说呃这个呃大批量生产完，然后再要过好长一段时间才换另外一个呢？我的整个的setting up time就会很长。然后呢你？如果说是经常去呃，这个呃change的话，那我们看到啊，这边a到BA到b一直在变的话，它的整个set up time呢就会缩减嗯。and a,yeah,well,we have putty some a small example in which we finally come into a point every apart,every interval in one point eight.days,uh,this is er er. well,it is starting with the question I ser the process time.we.where we are kneading five times,fourteen thousand found with pieces with multiplied with one second,so we end up with seventy two seconds.we have set up times of eighteen thousand seconds and in the end we have runtime close.the setup time,which is ninety thousand seconds,so now we have ninety thousand seconds and er.er,we want to produce in fourteen hours,so we this means everyone point eight seconds. er,we,we needer the corresponding er.every every part，every interval。嗯，好的，那呃，这边呢？另外还有一个概念叫e pei every part，every interval就是每个部分都会有一个这个间隔，对吧？就是你比如说。从a转到BB转到c，我这边都会有一个间隔，那我们也可以来看一下，就是在这个例题里面呢啊我的这个啊，总的running time是呃是这个九万个小时对吧，除了它running time加上它。它的rise呃，这个呃startup time对吧？这个呃，这德语里面的叫呃w time就是呃time。就是我们的set up time，那总共的投时间呢？是这个呃九万秒九万秒，那其中呢？它的这个process time是七呃这个七。72000呃七万两千两对吧？这个是呃，从我上面这个一共有五个products，然后呢？它的每班是有呃14400个piece。对吧，然后每个p is它的这个呃，这个circle time是一秒对吧一秒，所以说它总共得到的这个72000秒，然后它的set up time呢是这个呃一小时，然后我们把它转转换出来，对吧？是这个呃，这个一共一共是呃呃一一万八千秒，那18000秒呢，我们去呃，加上这个running time对吧？72000+18000，我们得到了九。万那九万的这个呃，一共是九万的，这个总时间呢，去除以我们的工作时间是两班对吧？两班是每班17个小时，那我们就是呃，一共是14个小时。所以我的epe I值呢，就是九万除以这个14个小时，那得到的呢是一点八嗯。也就是说，一点八天就会有一次间隔嗯。and when we go with this formula,but then we see,OK,we have first to produce c. then we shift.on BT oc.我走一首。there is a.e to ae呀e to aso ov。若ato BB to CC todd to ee to a。e to AB uter we are seeing the seconds from zero five to one. yeah,from a tob,from BT oc,this way. yeah,exactly its not the other way round. it is from here to here.and then with this,we finally fill the fourteen days. so it's a quite kind of a very simple calculation,but we need a cycle time,we need a.the setup time we need five products with fourteen thousand,four hundred pieces um and of course the shifts per day,which is in seconds fifty five.fifty thousand four hundred seconds,and with this we finally come to our conclusion of the epe I.嗯，好的，那我们这个epe I呢？就是说我们呃从呃，就比如说这个呃美，就是我们如果直接翻译过来啊，就是说是。every part的每一个每一个部件儿，然后呢？呃，它的这个interval也就是说像我们这边的啊，这个转换对吧？我的生产的节奏是首先我生产a，然后呢生产b，然后生产c，然后生产d，然后生产。e对吧？然后呢？e生产完了我再返回到a那也就是说它中间的我的这个set up time呃，首先呢，这个第一次是从a转到b对吧？第二次是b转到c，第三次呢是c转到d，第四次是d转到e。第五次是一转到a又回来了，对吧？那我等于说要经过这样子一轮以后才又回过来呃，生产我的a了对吧？就是说从上一次生产a到下一次生产a呢？我这个呃所谓的epe I值要需要一点八天呃，就是说我们要通过这个，如果说是这个要生产这些产品呢，我们要。经过一点八天后再回过来，再重新来锁定这个产品a好吧，这个就是这儿一点八天的意义。呃嗯。and well,how do we er make this er er feasible? we consider the week.then we go down to the day,then we go down to the shift,then we go down to the hour,maybe then we go down to the tack and even the pitch.so that time interval with the with a multiplication with the amount of the customer cycle time,but we know the customer cycle time we have calculated before.and now we can multiply this with the time interval.嗯，好的，那我们这个呃呃，它interval就是它要根据我的这个呃量和我的这个customer circle time，它们之间的比例去算出啊，有的可能是。它的中间的啊，这个呃，这个呃interval，它可能是一周对吧？也可能是一天或者说是一般一小时都有可能嗯。um,and of course er,there are some questions er whicher should be investigated when going through the factories,but this is not a pointer for us at the moment.what I think more is we can look on our er. let's say a planning into a nominal.condition of a factory,and then we have a stamping processes,we have welding processes,we have shipping processes.so these are,it looks a little bit chaotic,eh? because eh? there is no harmony,there are a lot of.在z。a solutions which have been elaborated stepwise and we can easily compare this and try to identify the.t the concepts er when we look in deeper into the er major er production roads.嗯，好的，那我们这个呃，前面我们这个案例对吧？这呃，我的这呃山茶地这个案例里面呢？我们现在这个手绘的这个。value stream analyze对吧？我们也可以看到呃，就比如说我现在的整个的呃，这个生产的节奏对吧？包括我的set up time，然后呢？几班这种排班那？那啊，到底具体的这个，比如说左多右多的一个转换等等的，它这些呢，都是有优化的空间的，对吧？包括什么时候做change over那呃，那在我的这个呃，现在current situation。那基本呃基础上对吧？这个是一个old就是一个呃现现状，或者说是老的这个规划，那我们有一些这个标的的考呃，这条件对吧？有一些标的条件。呃，那我们呢？就会有这么一两一两个或两三个可能性或方向去做它的这个呃，优化或者说对它现状进行一个这个呃。这个更改或者说根呃根据现状，我们来进行呃，在节奏上也好，它的更改对吧？那我们这个nominal我们就可以看到哎，这边是啊，明显的是三大块对吧？一块是我的。supplier look就是我的供应商的这条呃闭环，对吧？它是一个啊，在信息和运输流上的一个闭闭环，然后这边呢是stamping loop，就是在我的这个生产。呃，这个冲压这边的一个对吧？一个闭环，然后这后面呢是一个呃，这个所谓的起搏器闭环就是我的后面的这些工序对吧？到我的组装，然后到我的这个。呃，这个诉讼出库它这个呢？又是第三个闭环嗯。here you see a value stream for pill production,which is really large,and er we will not go in detail.into this Bill,production of course that this needs a lot of time to get to collect all the data to draw this,and you see it is also drawn very beautiful.more or less beautiful,but it is a complex product.嗯，好嘞，那我们呃，这边呢也给大家看一个案例啊，这也是我们这个呃。这个德国的一家公司，它是生产药丸儿的啊，就是pills啊，它的一个整个的生产线，它这边啊没有没有涉及到别的组装什么，它就是一个生产线，非常复杂，它也是一个。value stream的图啊啊，所以说我我们前面也跟大家说这个value stream analyze，实际上在公司里面对吧，结合这个精益生产，基本上所有用精益生产的这个企业都会来做这个value stream analyze。那我们可以看一下啊，它单纯的这个药丸儿生产的工序，它就是非常非常的复杂，对吧？如果要完成这么一张value stream analyze图的话，它也是。呃，一直是需要很多的，这个工作对吧？它而而且也是其实也是一一直在不断的优化，或者说不断的进化的这么一个流程嗯。yeah,then there,of course,here they have analyzed the throughput of the.there in the process time，the buffer time and the闰time of the different er products er and er。and then finally redesigned or made a nominal new concept where we have er here a step.here steps,here steps and um we are finally some,some additional controlled steps.嗯，好的，那它呢？也是根据就是最初的时候啊，最老原始的这个velocity analyze呢，对我的super time对吧？对我的整个的呃时间呢进行了细化的分析对吧？就包括我现在产线。线上有一二三四五六种这个不同的药丸儿，对吧？不同的产品，那我这绿色部分呢？是我的processing看对吧？然后呃橙色部分呢？是呃这个黄色部分是buffer看。然后呃，橙色部分是这个，也就是呃，生产的时间，然后呢，缓冲的时间以及我的这个存储的时间，然后我做优化优化以后呢，我们来看是不是可以减减减少，就是对我的。在在我的这个nominal condition的条件下，对吧？就是在我的这个呃，我想。要优化的这个呃，这些前提条件下呢，我们也是把它呃，这边你看啊，很清楚的，有几个大的loop对吧，这边是从supplier过来，这个是supplier loop对吧，然后这边是我们进场之前的一个loop，然后。后面是生产的loop和这个呃，这个到呃，那它呃到我们的最后的这个消费者端又是一个loop，对吧？它就是把它呃现在重新的结构规划了一下，然后进行。呃，这个呃，新的这个concept的优化嗯。OK，so here we stop。好，那我们今天就到这儿呃下，那我们明天见啊，拜拜。对''m sorry，it's the feel of the。if one didn't fall into them and find them with.我也是一个干。there are none of many obvious faults in which he gets the conditional as to why we have to win excited musics lus.呀OK。