**Session 2 – Team 2**

**E) Use of the method**

00:02:01 Speaker 1 - J

Yeah. So these are the steps of today. Welcome the session. Welcome. We're gonna. I'm gonna. I'm gonna give a very brief overview of the method. So I'm just going to explain the main steps. Then I'm going to present the case of PFAS in food packaging.

00:02:24 Speaker 1 - J

And then we're gonna go through that case and we're going to go step by step. So I'm going to very in a very detailed way, I'm going to present each one of the steps. So I'm going to go through step one and then we're going to do step one together and then we will discuss that step and so on and so on..

00:02:43 Speaker 1 - J

And and then we're just going to have, like a very general discussion of what what happened and what are your more general comments. So you have a chance to criticize each step and then just criticize the whole thing together.

00:04:37 Speaker 1 - J

So yeah, so it's, uh, it's overall, let's call them four steps. Steps 0 is really about identifying the substance of concerns. So we provide some guidance and we provide some.

00:04:51 Speaker 1 - J

Yeah, resources where you can find information about the substance that you're trying to analyze or for you to find substances in your product. Once you have identified the substance, you can go into step one. The reason I called step zero the.

00:05:10 Speaker 1 - J

Identifying part is because it may be the case that you already know what you want to get out of your product, so you you can you can skip the whole first. Well, the whole step zero part.

00:05:21 Speaker 1 - J

Then you go into analysis and 1st we look into, yeah, look into the substance. I provide guiding questions on what information is important to know. Then we look into the.

00:05:36 Speaker 1 - J

Product substance combinations and we look at it together and we look at it throughout life cycle perspective trying to find the emissions and the exposure.

00:05:47 Speaker 1 - J

And then at the end, we finalize by prioritizing those emissions and those forms of exposure. So you can say like, OK, I either want to focus on everything, because everything turned out to be bad, or I want to focus on something specifically. So we call that action points and and then I provide some.

00:06:06 Speaker 1 - J

Yeah, some strategies that, yeah that I found through research. I'll go into that a little bit later and then you can use those as inspiration to guide your, yeah, your conceptualization process.

00:06:22 Speaker 1 - J

Then hopefully after that you have a concept and then you go through an assessment of that concept at three parts. So we want to look into, OK, how is this new strategy or this new concept doing in terms of the substance of concern?

00:06:41 Speaker 1 - J

Did reduce the emissions, did reduce the exposure? Did it eliminate everything?

00:06:47 Speaker 1 - J

But also looking into OK does this new concept create new risks? Are we sure that this new substance that we're using is safe? Are we, you know, not creating anything new out there and also looking into trade-offs, so is this alternative way more expensive? Is this alternative causing a loss of performance?

00:07:13 Speaker 1 - J

Yeah, I I created for more for myself. We will discuss it later. I created an iteration. Guidance iteration is just something that happens very naturally in in design. So it's very difficult to put it in a process like this. But the idea is to is to just spark ideas.

00:07:47 Speaker 1 - J

Very quickly, because we're not going to go through that step together.

00:07:54 Speaker 1 - J

But we have step 0 just so you can take a quick look. We are not gonna. We're not going to work on this, but step zero is basically finding where the deadly deadly things are.

00:08:13 Speaker 1 - J

So I propose that you have your bill of materials and you do a scan of all of these things. You also go into a composition level so many times. It's not enough to say like, OK, polypropylene, you know, or I don't know, ABS or something. You probably have to search For more information on the material composition, for for example additives.

00:08:40 Speaker 1 - J

UM and then do a scan of that BOM into some of the resources that I provide at the bottom. Some of these are free, some of them are not free. So for example, the BOM check, I think you you mentioned last time Francisco that one is not open source, but there are quite a few resources out there that you can use as guidance.

00:09:04 Speaker 1 - J

UM and also in this method I'm trying to push designers to not only consider what's in their product, So what is intentionally added to the product, but also what could be unintentionally generated by your product. So here you have like microplastics.

00:09:29 Speaker 1 - J

So it's a good reflection to go through each of the steps of the life cycle and then say like, OK, is there anything that we're adding during production, for example, in some textiles, they add formaldehyde to avoid, like textiles from creasing in transportation. So they're still pretty when they get to the store.

00:10:02 Speaker 1 - J

Did we add anything that wasn't supposed to end in the product but just gave like an extra functionality temporarily?

00:10:41 Speaker 3 - F

I actually think that this step is.... because I had a brief look at all of this and I think that this probably is the most challenging step for designer, so I remember also like in in my previous company even though we had people with more chemical engineering background involved that that finding this information sometimes extremely challenging. So even even where you would have the BOM check, it would be difficult for all stakeholders to access it right? So, it's not like the company is using BOM check and then designers are also using it.

00:11:09 Speaker 1 - J

Definitely. I definitely agree. I think just data sourcing in general for, for, for, for this problem is very complicated. It's difficult to do something about it for like as as a researcher.

00:11:32 Speaker 1 - J

I only provide guidelines on what questions to ask your supplier, for example, and like what questions to, yeah, what kind of information you're searching, but it's difficult and sometimes it can come from a database, and sometimes it can come from your supplier and that is hoping that it's a transparent communication and that people actually tell you what's in your product.

00:11:53 Speaker 1 - J

So I definitely agree it's super complicated.

00:11:56 Speaker 3

But yeah, I don't. I I don't know what to do about it.

00:12:00 Speaker 3

It's so big that I'm not.

00:12:03 Speaker 3 - F

Maybe it could also be interesting, to try to understand also what stakeholder within your company you can come to with. So for instance, for repair, one important thing to know is like the failure rates, right? So failure data. And I remember that the first time I worked on it, everybody in the design was like, yeah, I don't know where to find this data. And then it was really difficult.

00:12:23 Speaker 3 - F

And now I think it's really helpful to know immediately when we work with any company like hey, we need to involve this department and sometimes the.

00:12:32 Speaker 3 - F

Our counterpart in the company, they don't even know why and that's what we have to explain because we know that these people are the ones who own this data.

00:12:39 Speaker 1 - J

Yeah. So what's gonna happen now is that I'm trying to see those interactions because it's gonna be very different from what happens in design agencies like this one. And what happens inside like a research and development team.

00:12:53 Speaker 1 - J

In a specific company and there's different levels. So for example, I interviewed an outdoor clothing company.

00:13:00 Speaker 1 - J

And they have no idea what they're doing. Like they they just go like, oh, no, I I don't. I don't know. I just go to the supplier. And the supplier says it's not there. So I believe him. And then there's other outdoor companies that are a little bit more. Yeah, that are bigger. And they have a little bit more leverage over their suppliers.

00:13:20 Speaker 1 - J

And they have a lot of, like, in-house research. So if you have that level of expertise, you can achieve much more than other types of companies that have no idea that they're just, like blindly relying on their suppliers

00:13:33 Speaker 1 - J

So those are those from a research perspective, is interesting, but what to do about it? And like how to guide people about it? That's that's a complicated step for sure.

00:13:48 Speaker 4 -IS

For your research it might be good to make a note of it note of it, but for the rest, it's like it's out of your scope....

00:13:52 Speaker 1 - J

Yeah, exactly. Yeah.

00:13:53 Speaker 3 - F

But did you mostly speak with product designers in these companies or with other people?

00:14:00 Speaker 3 - F

The problem is that like you have to take into account that you're talking to someone that never had to deal with this right and was never asked to do it. So if you ask to this target group, then probably they don't know anything of what is actually happening in the back end. So for instance, when I started like for repair, but also recycling designer. So like, yeah, this is something we don't do. And I was like oh wow.

00:14:20 Speaker 3 - F

And then I found out that there is an entire department in engineering focusing on this.

00:14:26 Speaker 3 - F

So I think even if designers might not be aware about this, there might be still actually someone in the company who is.

00:14:33 Speaker 1 - J

Asked all these questions but it was it was complicated because in this in this particular company they were outsourcing like most of the just delegating all of their production. So some of their production was happening in Portugal. Some of their production was happening in Poland, but then.

00:14:51 Speaker 1 - J

A lot of their production was happening in China, so they had like a lot of things going on. So it was hard to keep track, but that that's the only development team that I that they have. They don't have any anybody else doing.

00:15:06 Speaker 1 - J

Anything else and the contact with the suppliers is directly with the development team.

00:15:22 Speaker 1 - J

I also talked to the marketing department and it was interesting to see that people are not looking at these things.

00:15:29 Speaker 1 - J

Yeah. Anyway, so we're gonna, we're gonna jump into the case.

00:15:35 Speaker 1 - J

Yes, I'm again, we're going to go through each one of the steps. The idea is to not focus on the case. The case is just on excuse. It's focusing on the on the, on the method, and how how can we improve this? The case is food packaging and PFAS.

00:21:40 Speaker 1 - J

Now you will use my method to deal with the substance of concern. Again, we are focusing on burger wrappers just to narrow it a little bit. You will work in teams.

00:22:16 Speaker 1 - J

OK. So we're first going to go to step one, so I'm going to give you.

00:22:25 Speaker 1 - J

three forms that you're gonna fill up for me.

00:22:52 Speaker 1 - J

So let's go first into step one. So that's that. Yeah. Step one, step 1A.

00:23:03 Speaker 1 - J

So in step 1A, we're just going to fill up the information about the substance. So here I just, I just have a bunch of guiding questions. We just say like, OK, well, we're gonna, we're gonna find out the name of the substance. Are there other names of the substance?

00:23:22 Speaker 1 - J

What is the function of the of the substance in the product?

00:23:26 Speaker 1 - J

What kind of hazard does it cause in health and the environment? How is the substance currently regulated and how much of it is in the product number six is how much do we produce out there?

00:24:32 Speaker 1 - J

Yes. So that would be.

00:24:34 Speaker 1 - J

Step 1A.

00:24:38 Speaker 1 - J

Then we have step 1B, which is where we are going to be looking into the into the burger wrapper, right. So now we have like a product substance combination.

00:24:52 Speaker 1 - J

And we're going to see what the emissions and what the exposure is for each one of the stages of the life cycle. It may be the case that, for example, for transport, we don't have any data or we don't have any emissions or any concerning exposure and for.

00:25:14 Speaker 1 - J

You have to choose one of the scenarios for EoL, so in your scenario you can say like well our burger wrapper. The existing scenario is that it's landfilled or incinerated. What are the emissions and what are the exposure of your current product?

00:26:53 Speaker 1 - J

Then you have to grade them (the scenarios).

00:26:58 Speaker 1 - J

The reason we grade them is because it's it's hard sometimes to focus on everything at the same.

00:27:05 Speaker 1 - J

And so here we just establish the level of concern. So is this scenario very concerning? Is this moderately concerning? Is this little no concern or?

00:27:18 Speaker 1 - J

Yeah. Again, it can be that it's inconclusive. So then that would mean that you don't have enough data to say this is a safe scenario or this is an unsafe scenario.

00:27:30 Speaker 1 - J

And and the reason it's on a wheel is just so you can compare them and and and look at them. So if we go back to the to the case that I was mentioning.

00:27:38 Speaker 1 - J

The PVC flooring here we can see that the landfill is very concerning because these products are mostly landfilled again because they're may be contaminated with something.

00:27:49 Speaker 1 - J

And so if they are landfill, they are just emitting the substance everywhere and they're very concerning during the use phase because there are a lot of these floorings being installed in houses with the house with, with the floor heating and.

00:28:09 Speaker 1 - J

Then you can have skin contact, inhalation etcetera, etcetera. So you just grade them, you just say like well, these are the most concerning ones.

00:28:18 Speaker 1 - J

And I give a little bit of guidance on how you can decide that.

00:28:22 Speaker 1 - J

Should we go through it? Should we? Yeah, yeah.

00:28:25 Speaker 1 - J

Do you guys want to go through the first three steps? Yeah. Yeah. OK, let's see. This is I will give you the. This is all the data that you need for the case of the PFAS.

00:28:55 Speaker 1 - J

I will give you around 15 minutes for these first three things.

00:29:08 Speaker 4 -IS

So what is the substance of concern?

00:29:18 Speaker 4 -IS

But like you mentioned, there's 4000. Do we nee to be more specific?

00:29:21 Speaker 3

No, keep it as PFAS for now.

00:29:36 Speaker 3 - F

All right. So I think you need to write it there, right?

00:29:39 Speaker 4 -IS

Do we have to ride over the example?

00:29:44 Speaker 1 - J

Yeah. Yeah, yeah, yeah, yeah. I I included the example answers in a very light Gray. So you can write on top of them.

00:29:53 Speaker 1 - J

So if you're confused by something, you have an example as a reference.

00:30:13 Speaker 3 - F

So was this the function of the substance in the product?

00:30:19 Speaker 3 - F

Providing water and grease repellency.

00:30:25 Speaker 3 - F

And resistance to degradation.

00:30:37 Speaker 4 -IS

Decrease degradation.

00:30:54 Speaker 3 - F

What kind of effect does it have?

00:30:58 Speaker 4 -IS

On the health and the environment. Consider direct hazards and those that are not directly visible (read out loud).

00:31:09 Speaker 3 - F

Well, yeah, we have a list.

00:31:11 Speaker 4 -IS

Yeah, hahah see list in table...

00:31:18 Speaker 3 - F

On the environment.

00:31:22 Speaker 5 - IR

It says Health and the environment.

00:31:28 Speaker 5 - IR

Isn't it also like, because your food is in contact with it?

00:31:37 Speaker 4 -IS

So in addition to those lists, let's see it's persistent bioaccumulative.

00:31:43 Speaker 4 -IS

Toxic reduction of different species of worms00:32:02 Speaker 4 -IS

Biochemical effects on plants

00:32:06 Speaker 4 -IS

Productive toxicity of fish and impacts on liver of rats.

00:32:11 Speaker 3 - F

So we should just maybe copy.

00:32:14 Speaker 1- J

Yeah, you can just say. See the list... Yeah, it's just it's just an exercise, so don't worry.

00:32:28 Speaker 3 - F

How is the current? How is the substance currently regulated or banned?

00:32:40 Speaker 3 - F

So should we also say see the list?

00:32:42 Speaker 1 - J

Yeah, you can. Yeah, it's, it's OK. I can tell you I can give you a summary.

00:32:47 Speaker 3 - F

I think like overall, So what I think we are doing is simply like these are the informations that ideally we have to fill out that form right?

00:32:55 Speaker 3 - F

So for me this is what I want to know how to make (pointing at the summary of PFAS).

00:33:31 Speaker 3 - F

Yeah. So I think like this structure and also the next steps are a very good way to structure it, how you should address the topic.

00:33:42 Speaker 3 - F

Yeah, but at the same time, I feel like because a lot of these things I believe are big things that we could probably do also for other topics, right. So for instance, looking at the impact that something has throughout the product life cycle and then the type of impact is different.

00:34:00 Speaker 3 - F

So I think the the approach is something that that that we are probably familiar with also for other topics.

00:34:08 Speaker 3 - F

And again, I think that's the challenging part. So if we would not have this and then I think probably I don't know how likely we would be to actually be able to fill this out.

00:34:20 Speaker 1 - J

It depends on how much of the substance is known, yeah.

00:34:25 Speaker 3 - F

For instance, also like all the information that you capture here about the impact of PFAS, right. So I'm thinking, let's say, best case scenario I can get access to the full BOM and I have all these things.

00:34:40 Speaker 3 - F

Then probably I will go maybe on these websites and maybe they can give an idea about what these substances are and what are the common use, but I have the feeling that you are you have a lot of information that....

00:34:52 Speaker 3 - F

Would we be able to find it, for instance on the SIN List?

00:34:55 Speaker 1 - J

Yeah, I think the SIN List, for example, gives you.....

00:35:00 Speaker 1 - J

A list of hazards. It gives you a list of potential alternatives, and it sometimes it has references to regulation. But if you also search it in the in the CLP from the European Chemicals Agency, CLP will make a summary of what the hazards are and.

00:35:20 Speaker 1 - J

It will tell you what the relevant regulations are, whether it's in REACH, but it's if it's also in the like classification, labeling and packaging regulation etcetera, etcetera. So you will you, you do have databases that give you this basic information.

00:35:36 Speaker 1 - J

I think step B is actually a little bit more complex.

00:35:43 Speaker 1 - J

Yeah, step B because step B asks you to imagine things right? Like where where is your product going? There's no database that is going to tell you I had this this particular container that has PFAS behaves like this in a in a life cycle. That's something that you have to.

00:36:02 Speaker 1 - J

To to come up with as a designer who knows their product. You, you, you. You know what happens with your product in each stage of the life cycle or ideally you know what happens on each stage of the life cycle.

00:36:17 Speaker 1 - J

But then we can we can move to step B if you want?

00:36:23 Speaker 1 - J

Step 1A is indeed just guiding question. Yeah.

00:36:31 Speaker 3 - F

But I was wondering these like on these websites PFAS is a specific case, but I can imagine there are other...

00:36:38 Speaker 3 - F

Substances of concern that can be used for different applications. And then I think the the challenge is to find informations about your specific context right. So you are using that substance in that way and so what does that mean?

00:36:58 Speaker 5 - IR

With the last question on how much is put in the market annually....

00:37:02 Speaker 5 - IR

I was wondering like what do you do with this information? Like do you have like a number and then like we compare at the end of your design process or?

00:37:10 Speaker 1 - J

Yeah, it could be one of the reference points where you compare.

00:37:15 Speaker 4 -IS

Yeah, good one.

00:37:17 Speaker 5 - IR

Yeah, because like I can imagine, like, if, like, you know, yeah, if you find that oh, it's not that much, do you then not do something about it? Like no. So that's what I mean right?

00:37:26 Speaker 5 - IR

Why are you asking this? say, well, maybe it doesn't exceed this and I won't do anything about it. Or is it to compare in the end? or what

00:37:34 Speaker 1 - J

Yeah, it's a good observation indeed. I think it would be mostly to compare at the end and say like, OK, are we instead of reusable packaging, we went for the sorry, the single use packaging, we went for reusable.

00:37:51 Speaker 1 - J

So now maybe we are not even creating tons of paper contaminated paper out there. Yeah, or something like that, but yeah.

00:38:00 Speaker 5 - IR

What I'm wondering, like if we're just like, very like, focus on one.

00:38:06 Speaker 5 - IR

Like part of the products and the material, of course then indeed if you would go for reusable packaging then....

00:38:17 Speaker 5 - IR

Like it looks a bit like if you then would redo this.

00:38:21 Speaker 5 - IR

You won't get the full picture of.

00:38:24 Speaker 5 - IR

Like other like other implications that's come with maybe reusable packaging.

00:38:31 Speaker 5 - IR

For example like production and stuff like that.

00:38:33 Speaker 3 - F

Maybe you added like, hazardous substances that need to be used in the reusable packaging?

00:38:40 Speaker 5 - IR

Sorry?

00:38:40 Speaker 3 - F

Maybe adapt the substances that you are introducing because you are making the packaging reusable?

00:38:45 Speaker 4 -IS

I think that's another step right?

00:38:47 Speaker 1 - J

Right. Yeah, that's that's that's the next step that's that's in the next steps, but.

00:38:54 Speaker 4 -IS

Tradeoffs and potential negative effects (reads outloud). And if you do that analysis well enough, then you would take into account like the whole scope of your your new material.

00:39:03 Speaker 3 - F

Should we continue?

00:39:04 Speaker 4 -IS

Yeah. Yeah. So for production, peoples may be released into wastewater streams from production plants, contaminating surface and groundwater also emitted into the air and dust.

00:39:19 Speaker 4 -IS

So water and.

00:39:22 Speaker 4 -IS

Air pollution.

00:39:39 Speaker 5 - IR

Yeah. So probably people that live around those.

00:39:46 Speaker 4 -IS

Yeah, people that live around the area

00:39:49 Speaker 5 - IR

Question how do you get PFAS like where? yeah, where are they produced?

00:40:03 Speaker 4 -IS

A supplier, they have a special chemical supplier.

00:40:15 Speaker 1 - J

There is the production of the PFAS itself. Yeah. but you can also get a material that could already contain PFAS.

00:40:29 Speaker 5 - IR

Yeah, but I'm wondering like to get the like the the the resources to make PFAS, is that process already contaminating?

00:40:42 Speaker 4 -IS

this this life cycle is all about the burger wraper, right? Yeah. So it's not necessarily about the production of PFAS themselves.

00:40:53 Speaker 1 - J

Yeah, exactly.

00:40:56 Speaker 4 -IS

We assume they've already been made and they've been sold.

00:41:00 Speaker 4 -IS

To burger wrapper companies.

00:41:07 Speaker 3 - F

Yeah, I'm wondering, maybe the scenario where once the the substance is produced, maybe it's not that's not hazardous anymore, but maybe created some impact in the production phase.

00:41:20 Speaker 3 - F

So I think like well, batteries are not a good example, but there are some substances that might create a huge impact.

00:41:30 Speaker 3 - F

In the production of the substance itself, but once it's actually produced and put in a product that is not a problem anymore, like for instance, if you need that other substances to mine that substance. could be maybe interesting to add that...

00:41:52 Speaker 1 - J

It used to be there. I eliminated it.

00:41:55 Speaker 3 - F

OK.

00:41:58 Speaker 1 - J

My supervisors were like, oh, actually, maybe that's too much. Maybe that's out of the scope of designers. And now I have designers being like, wait, where do PFAS come from?

00:42:17 Speaker 4 -IS

Ok now, transport.

00:42:19 Speaker 5 - IR

Like accidents... like you mean like if like oil tanker breaks and then oil gas.

00:42:25 Speaker 1 - J

Yeah. Yeah. So, so this may not be relevant for for PFAS because now again we're talking about the the PFAS in the burger wrapper.

00:42:36 Speaker 4 -IS

If the burger wrapper truck crashes and there's all these burger wrappers end up in the highway..

00:42:45 Speaker 5 - IR

I think that's probably the least of our concerns right?

00:42:48 Speaker 4 -IS

Yeah, because in use, in the use phase, we have the migration of PFAS from packaging into the food and this is aggravated by fatty foods and the duration of contact with the food.

00:43:01 Speaker 3 - F

So migration to food exposure....

00:43:06 Speaker 4 -IS

But then, for example, it's just touching it, then it can also migrate to your skin, right?

00:43:12 Speaker 4 -IS

So it's not just, yeah, the migration to food, it's also just exposure to skin.

00:43:19 Speaker 1 - J

Yeah. So you ingest it, you touch it, and probably inhale it?

00:43:38 Speaker 3 - F

Also here we should not indicate the effects that it it does, but the the, the situations.

00:43:45 Speaker 1 - J

The situation. Yeah. Yeah. So you're describing how it happens. How are emission happening in your product.

00:43:57 Speaker 1 - J

That's a little bit tricky to explain because when you read about a substance in literature, it's going to tell you like, Oh yeah, emissions from PFAS are terrible. And they come from food packaging, and they come from jackets, and they come from everywhere. But that doesn't tell you anything about your product. So....

00:44:16 Speaker 1 - J

If if literature gives you information or a database gives you information that this thing migrates, that this thing contaminates water as well, etcetera, etcetera, then you can go back to your own product and see how it behaves for your case.

00:44:32 Speaker 4 -IS

Yeah. OK. Yeah. Because again, like a lot of these fast food packaging ends up.

00:44:38 Speaker 4 -IS

Just being thrown away, right, people, people, those who drive through at restaurants and then they throw it out of the window. So that's how it ends. It ends up in the ecosystem.

00:44:52 Speaker 3 - F

So again, what's the difference between emission and exposure?

00:44:55 Speaker 1 - J

Yeah, emission is just that things leave the the the product. So they leave your product and they go somewhere else and exposure is how was a person or a or an animal or an Organism are affected and exposed to it.

00:45:12 Speaker 4 -IS

OK, that's more like outputs and inputs.

00:46:15 Speaker 1 - J

But at at this point you don't have to be so detail about it. You just have to think things like what you just did, like you just. I think you just have to go to like, well, people throw this on the on the ground sometimes, which is an undesirable behavior.

00:46:36 Speaker 4 -IS

I think maybe also a lot of times with the collection.

00:46:41 Speaker 4 -IS

So for example, the the paper wrappers with like a film on it, like usually.

00:46:48 Speaker 4 -IS

Users will think like, oh, it's paper and they'll just put it in the paper recycling bin, you know.

So so maybe like improper disposal ...

00:47:01 Speaker 4 -IS

Waste stream separation is an issue.

00:47:16 Speaker 5 - IR

The one of the the brands now has like new packaging and I think the front is like paper like and they also promote on the front they they promote like Oh yeah like reduce plastic.

00:47:34 Speaker 5 - IR

What does it say? Again. Yeah. Reduce plastic like so much percentage. Just paper or something like that. And so I was eating at a friend's with a friend and. And she was like, oh, yeah, yeah, I bought this one because. Oh, it's nice. But then where do I put it? Like, what? What do I do? And and I was like, and she asked me because like, you're designer you know...

00:48:00 Speaker 5 - IR

I tried looking on the packaging, it didn't say I should throw it in the paper or plastic or just genral waste. And then I even googled it. I read it because I really wanted to know because it won a prize and I was like, but I still don't know where I need to put it and I don't think this is better because now it's probably plastic laminated with paper and probable even worse.

00:48:32 Speaker 3 - F

So what? What they put it is people throw it on the ground. It can end in the compost bin or it can end in the they have wrong waste collection system.

00:48:37 Speaker 5 - IR

Well, people don't know where to put it. Yeah.

00:48:41 Speaker 5 - IR

Yeah, like misinformation or like lack of information, I.

00:48:47 Speaker 4 -IS

Should we maybe try to think of one example for each of the following stages?

00:48:54 Speaker 1 - J

You can choose the stage for example, so you can choose like, OK, the existing burger wrapper usually gets landfilled or incinerated because it is contaminated with food.

00:49:09 Speaker 3 - F

I mean, probably, probably incineration.

00:49:09 Speaker 5 - IR

There's one or the other right, I mean.

00:49:36 Speaker 4 -IS

Ok so, in the Netherlands probably incineration. PFAS has been found to be emitted....

00:49:38 Speaker 4 -IS

Through incineration, fumes and remain in ashes so.

00:49:43 Speaker 4 -IS

I think that's also like.

00:49:46 Speaker 4 -IS

Lack of information with incinerators or just, you know, burning things, doing their job and then.

00:49:56 Speaker 4 -IS

They never asked for pfas to be in the waste, and now they're there so.

00:50:01 Speaker 4 -IS

I'm not sure what they could do about it.

00:50:04 Speaker 3 - F

Yeah, but so for instance also here, what we know is alright, this is what probably with the with the would would would happen but then I would probably try to deep dive into our incinerator. So really tackling that right. So I always hope that at least in Europe there is some regulation.

00:50:21 Speaker 1 - J

And some will, some also for landfill there is there is uncontrolled landfills and there's controlled landfills. So then that means that they some landfills have mechanisms to avoid substances to leave.

00:51:06 Speaker 5 - IR

Can you also kind of collect it in a way?

00:51:11 Speaker 1 - J

There, there's also that there's also studies about it's called remediation.

00:51:26 Speaker 1 - J

Is that what you mean?

00:51:27 Speaker 5 - IR

Yeah, that's what I mean.

00:51:31 Speaker 5 - IR

Well we are saying recycling is not always doable, but then you need to collect it... so If you can make a barrier then maybe you can collect it safely as well

00:51:41 Speaker 4 -IS

Could you also filter through the air potentially?

00:51:45 Speaker 4 -IS

Oh, OK, because then incinerators should do that?

00:51:52 Speaker 3 - F

What I was saying is that this is a question mark, right? Are they already doing it or because and then this also is quite a big risk...

00:52:00 Speaker 3 - F

because I saw it for instance on recycling, right? Like a lot of these more downstream stakeholder, they simply adapt it to the current design challenges, right? So an example is batteries in electronic products that create problems during the shredding.

00:52:14 Speaker 3 - F

They simply found ....adapted to that, so they they have to sort out all the products with batteries and then they use a hammer and they destroy the product.

00:52:24 Speaker 3 - F

And then when you go to manufacturer and you suggest, well, we could make the battery easier to remove then they're like, yeah, why? I mean, they already adapted and they use hammer. So why we should not solder the batteries since they already have a hammer and they are prepared to hammer it out. And I think that this is always the problem that you get a lot of stakeholders in the value chain...

00:52:44 Speaker 3 - F

Are already adapted to a bad design and then the manufacturer has much less incentives to actually change that because then they say well, even if it ends up in incinerators, there is a filter in it.

00:53:01 Speaker 5 - IR

It can also maybe be that in the Netherlands it is really good and controlled. But not in other countries.

00:53:26 Speaker 1 - J

Now we go into step C of step one.

00:53:30 Speaker 1 - J

This is really about rating what you just analyzed, so you just looked at your product substance combination and you were like, OK, these are all the possible scenarios and now we want to try to find what are the most concerning ones, what are the ones that you really want to avoid from happening and which ones are maybe less interesting.

00:53:59 Speaker 5 - IR

You do this for the wrappers again right?

00:54:01 Speaker 1 - J

Yeah, yeah, yeah.

00:54:02 Speaker 5 - IR

Transport, I think...

00:54:04 Speaker 3 - F

Maybe not right?

00:54:05 Speaker 5 - IR

Little to no concern.

00:54:12 Speaker 5 - IR

Yes, use. I think there is quite high. Yeah, I think, yeah, yeah.

00:54:24 Speaker 5 - IR

Yeah, collection maybe I would say yes, because a lot of people throw it somewhere wrong.

00:54:30 Speaker 3 - F

Well, but I mean in this case we are already talking about people eating pfas. This is maybe ending up in the ground. Maybe I will give it 2 out of 3

00:54:38 Speaker 5 - IR

Yeah, not the highest.

00:54:40 Speaker 3 - F

To distinguish because one you're already eating it in your mouth, yeah.

00:54:44 Speaker 4 -IS

But this is one of the main.

00:54:47 Speaker 4 -IS

Issues when it comes to all like the end of life scenarios.

00:55:05 Speaker 5 - IR

Manufacturing That's not really a problem right? Or maybe.

00:55:07 Speaker 4 -IS

I think it's not really non applicable I think.

00:55:11 Speaker 3 - F

Yeah.

00:55:16 Speaker 5 - IR

Recycling,.... well, so it does. If it gets recycled with stuff that doesn't have PFAS. So is it high then?

00:55:31 Speaker 4 -IS

If it is recycled improperly then it will get used again and the use case is like the use phase is one of the most concerning.

00:55:42 Speaker 3 - F

I think probably I don't know what I would do before filling this out would be to check if what are the measures against it in recycling and landfill and then maybe depending on that, right. So if in the landfill they tell you ah, we do nothing about it then I would say it is very high..

00:55:59 Speaker 1 - J

Exactly. So I think that that information would come in this step in or in my in my view of how things would perfectly go.

00:56:06 Speaker 1 - J

Is here you would see where is my thing being recycled? Is it being mechanically recycled or is it chemically recycled are PFAS eliminated after that recycling or not?

00:56:17 Speaker 1 - J

and then maybe you would know and have enough information to fill that in.

00:56:22 Speaker 5 - IR

OK. Maybe just do it like in between?

00:56:25 Speaker 4 -IS

Two out of three, yeah.

00:56:34 Speaker 5 - IR

The score of landfill also depends on the situation.

00:56:37 Speaker 4 -IS

Depending on on the on the context.

00:56:51 Speaker 4 -IS

As for production.

00:56:54 Speaker 4 -IS

Yeah, the wastewater streams and stuff like that and people.

00:56:59 Speaker 4 -IS

Living around the production facility.

00:57:01 Speaker 5 - IR

It's the same for these, right? Like if they're doing it properly the it is less of a concern.

00:57:10 Speaker 4 -IS

may be also two? At least two....

00:57:18 Speaker 4 -IS

This one.

00:57:20 Speaker 4 -IS

Yeah, it's the repair one.

00:57:23 Speaker 4 -IS

We don't have any information.

00:57:26 Speaker 4 -IS

And it's not really applicable.

00:57:43 Speaker 1 - J

All right. So if you, if you would have to summarize your action points, if you would have to say like, OK, this is where we have to focus.

00:57:51 Speaker 1 - J

Right now, with the information that you have, what would you say is?

00:57:56 Speaker 1 - J

Your focus is going to be on the next step.

00:58:01 Speaker 4 -IS

I would say anything use related and touching upon the use phase. Also the collection because improper collection inproper separation contaminating waste strings only leads to more problems eventually.

00:58:05 Speaker 1 - J

Yeah.

00:58:17 Speaker 3 - F

And I feel that maybe for designers, actually the collection could be easier to tackle...

00:58:21 Speaker 3 - F

... because this is more about behavior change. Maybe ... rather than getting into finding alternative chemicals.

00:58:30 Speaker 1 - J

OK, cool. All right.

00:59:11 Speaker 1 - J

Let's move into step 2... And these are strategies that you can use to inspire your, yeah, your conceptualization step a little bit. There's three main strategies that I have identified in cases in the past.

00:59:30 Speaker 1 - J

So one would be avoid which is any any intervention in the product that eliminates the substance of concern the.

00:59:38 Speaker 1 - J

So that can be either by substitution, but it can also be like OK, do we even need a burger wrapper to begin with? Can we make it a floating burger? I don't know. Just satisfying a function in a different way. Another one would be phasing out. So can we make burger wrappers that work without even using anything else?

00:59:59 Speaker 1 - J

Or or, or even a substitute and these type of strategies are within the hazard approach. So do you do you understand the difference between hazard and risk?

01:00:14 Speaker 1 - J

OK, so hazard is all of the characteristics that make something potentially dangerous. So we know that in the intrinsic intrinsic characteristics of pfas, they are carcinogenic. They are persistent organic pollutants and whatnot. But.

01:00:34 Speaker 1 - J

If they're not out there, and if they're not in contact with people or the environment, they're not harmful, you know, so they have all of this potential of harm, but until you are in touch with them or until they're in the environment, then there's a risk of causing any problems. Is that more or less clear?

01:01:15 Speaker 1 - J

Then there is a risk approach which is like, OK, well, the substance of concern is going to remain in use because by regulation we need this functionality or because there's really no other alternative and we need this to work in a certain way etc etc.

01:01:41 Speaker 1 - J

Yeah. And so if the substance of concern remains in use, we want to either reduce emissions or reduce exposure to the substance. This can be by providing information or increasing the useful life of products so they don't end up in the in the landfill and accumulating in the landfill. It can also be that you reduce the content of the substance of concerning the products instead of using 10 grams of pfas we will use 2...

01:02:07 Speaker 1 - J

And then you have all of the control strategies, which means that you prevent all emissions and all exposure from happening. That can be by containing or isolating the the the substance of concern.

01:02:20 Speaker 1 - J

Or it can also be through OK we have control recovery. We have controlled recycling for example.

01:02:34 Speaker 1 - J

These are the inspiration strategies, so depending on what you decided here, what you saw were the main problems here. Ideally you would you would try to choose one of these strategies and say like OK well we want to remain using PFAS because... and then we're going to control them or we want to avoid PFAS all together and then now the idea is you would choose one of these strategies and develop a concept in a few minutes...

01:03:02 Speaker 1 - J

Just as a quick exercise. OK, do you have questions?

01:03:05 Speaker 3 - F

No, it's clear...

01:03:09 Speaker 3 - F

we need to pick one of these strategies. Right? Shall we do avoid?

01:03:13 Speaker 3 - F

Is the most interesting one...

01:03:34 Speaker 3 - F

Well, so I'm trying to think what is the worst case scenario if we don't put the PFAS in the wrapper...

01:03:41 Speaker 4 -IS

That it is gonna start leaking....

01:03:40 Speaker 4 -IS

greasy fingers...

01:03:50 Speaker 5 - IR

I can imagine like if it's a takeaway...

01:03:54 Speaker 5 - IR

Can potentially be a problem for a person, right? Yeah. But if you're eating it in at the restaurant...

01:04:00 Speaker 5 - IR

Yeah, I mean it's on the platter thing anyway, so.

01:04:09 Speaker 3 - F

Yeah, I'm wondering if maybe just putting an extra layer of paper or something if maybe that could help. So I don't know, probably the first thing I would do here is to Google how they did it before PFAS and probably you have to go a bit back, But yeah.

01:04:25 Speaker 5 - IR

Like the pizza boxes they're usually, I think a lot of them don't.

01:04:32 Speaker 5 - IR

They're good. Greasy, but they're they. Some, some. Some some. Yeah, some some greasy.

01:04:44 Speaker 3 - F

I think why they don't use it? That's because pizza is not greasy at the bottom...

01:05:00 Speaker 3 - F

Yeah, yeah. So I'm trying to think why they do it for burgers and not for pizza...

01:05:08 Speaker 5 - IR

Cheaper?

01:05:09 Speaker 4 -IS

Maybe marketing, maybe also there's some some marketing reasons.

01:05:15 Speaker 3 - F

OK. Well then maybe a solution that we so we have to put different solution right different concepts.

01:05:19 Speaker 1 - J

Yeah, yeah, you can. You can develop one or more..

01:05:22 Speaker 5 - IR

Maybe thicker cardboard?

01:05:39 Speaker 3 - F

I mean you have a smaller pizza cover right? Like sometimes when you get only a slice of pizza or maybe something else they give you something smaller..

01:05:54 Speaker 4 -IS

There's lots of things possible when it comes to cardboard.

01:05:57 Speaker 3 - F

And then in this case, then I would also try to look at the carbon footprint....

01:06:01 Speaker 3 - F

I will start wondering with maybe this box has a higher footprint...

01:06:05 Speaker 5 - IR

Yeah.

01:06:05 Speaker 5 - IR

I think that's the next step...

01:06:09 Speaker 3 - F

OK, sorry.

01:06:14 Speaker 3 - F

What else could we do?

01:06:19 Speaker 4 -IS

Packaging as a service, like alternative value propositions or function. I think the floating burger would be amazing.

01:06:32 Speaker 3 - F

Bit of a stretch, like when when we went to suriname, they were serving food in banana leaves so I would. I would assume that banana leaves have some properties that you know they can only improve. Then I suppose that there is quite some production waste from all these bananas maybe?

01:06:55 Speaker 4 -IS

And banana leaves? Yeah, that would be nice.

01:06:59 Speaker 3 - F

Or maybe another leaf like.

01:07:07 Speaker 4 -IS

Could also provide some kind of glove with the burger so that instead of having packaging you have like gloves to prevent your finger from getting greasy.

01:07:21 Speaker 3 - F

OK, OK.

01:07:37 Speaker 1 - J

When my mom gets her hair dyed, I dye it for her. It comes with the gloves..

01:07:46 Speaker 3 - F

In Europe, I don't know how they will take it I think they would be like, they finally got rid of straws and stuff and now we give gloves!

01:08:00 Speaker 3 - F

Of course it could be reusable, right? So if you go often to the same place...

01:08:10 Speaker 3 - F

It could be something that is kept by the producers, or in the restaurant. Otherwise it could be something that you purchase and then you can go back with the same box.

01:08:23 Speaker 1 - J

Yeah. The one in France, what they do is that they charge you if you want the disposable one, they charge you extra.

01:08:31 Speaker 1 - J

And then if you are eating there then they give you the reusable one that's free of cost.

01:08:39 Speaker 3 - F

Yeah. Also in the Netherlands, they are now starting, I think I think we are already paying for it. Like if you look now it's there like if you go to the supermarket to buy a salad box, then you pay extra for packaging.

01:08:51 Speaker 1 - J

Yeah. Yeah, that's that's that's a new law right?

01:08:55 Speaker 5 - IR

I think they were already talking about reversing this law...

01:09:00 Speaker 5 - IR

because it it's causing too many issues.

01:09:02 Speaker 3 - F

Yeah, yeah, because I saw this documentary on Nos was practicing my Netherlands and they they they showed this that some people they went like journalists to a fries place, right where you buy fries and they ask are you charging me more because of the box?

01:09:20 Speaker 3 - F

and they were like, yes, and they were like, OK, I have my box and then they were like, no, I don't want to use it because I don't know if it's contaminated or something. So that can be complicated I think...

01:09:34 Speaker 1 - J

ok, so if it is reusable, what material is it made of?

01:09:41 Speaker 5 - IR

Ceramics or or plastic?

01:09:58 Speaker 5 - IR

glass, metal ....

01:10:01 Speaker 4 -IS

You have also had these these aluminum trays right?

01:10:06 Speaker 3 - F

Ohh yeah, maybe aluminum is interesting. Although LCA wise... too much impact...

01:10:13 Speaker 4 -IS

For example the ones they use for the ready to eat lasagnas...

01:10:20 Speaker 3 - F

Yeah, yeah, yeah, yeah.

01:10:26 Speaker 3 - F

Well, I think if they're usable probably... I think it would be plastic. I don't think that the business model wise depends what type of company you are, right? But if I think about fast food chain...

01:10:38 Speaker 1 - J

In one of the restaurants they use a reusable on that is very thick, and now it has like kind of like a lot of scratches like last time I got fries it was, it was very scratchy and whatnot. So I was a little bit disgusted by it...

01:11:05 Speaker 3 - F

Because they reuse it right? so you use it and then you bring it back to them...

01:11:12 Speaker 3 - F

I can imagine deterioration is going to be a problem, yeah.

01:11:15 Speaker 4 -IS

Especially hygiene wise... lots of stuff gets in scratches.

01:11:43 Speaker 3 - F

I think we have enough concepts...

01:11:54 Speaker 1 - J

Yes, shall we move to the next step?

01:12:34 Speaker 1 - J

In this step we will evaluate the design.

01:12:45 Speaker 4 -IS

Shall we first pick a design?

01:12:50 Speaker 3 - F

Do you have preferences on your side?

01:12:52 Speaker 1 - J

No, no, you have to pick, I cannot pick for you.

01:12:58 Speaker 3 - F

Let's do aluminum?

01:13:00 Speaker 1 - J

Yeah. Yeah. OK.

01:13:50 Speaker 1 - J

You will now assess the aluminum container. and you will assess three things. So this first three triangles are....

01:13:56 Speaker 1 - J

Indicators we're going to compare it to what happened in our assessment here and we're going to see, OK, did we achieve any reductions in these in these concerning scenarios? So the substance of concern is no longer there. So did we achieve something good? That's the first step.

01:14:30 Speaker 1 - J

After that we are also going to start thinking about new forms of environmental impact.

01:14:37 Speaker 1 - J

And where are those impacts coming from now? So for example, you mentioned from the aluminum point of view, perhaps the impact from extraction and production is just increased a lot.

01:14:53 Speaker 5 - IR

I have a question. So now we are rating on if we did reduce it or not so wouldn't that kind of give the wrong idea? Because we cannot really compare it?

01:15:13 Speaker 4 -IS

but we are talking about the risk of PFAS right? and so assuming we've completely eliminated all PFAS in all lifecycle stages... then we achieved a reduction in concern..

01:15:22 Speaker 5 - IR

Yeah, but what I mean is, for example, like this is high, so if we would reduce it. It might be there or there, or am I confused?

01:15:37 Speaker 4 -IS

We are going to rate the PFAS concern

01:15:42 Speaker 5 - IR

Yeah, but maybe let me explain with this one. So we rated this one two. Maybe it stayed the same? (Reads instructions in paper).

01:15:58 Speaker 5 - IR

OK. Yeah, yeah, yeah. OK, I understand.

01:16:01 Speaker 1 - J

So this is the concern stayed high. This is the concerned stayed moderate and this is we were able to reduce the concern or there was minimum concern to begin with.

01:16:05 Speaker 5 - IR

Yeah, yeah, yeah, yeah.

01:16:13 Speaker 4 -IS

Didn't we reduce the concern in all of them? because we avoided the SoC?

01:16:19 Speaker 5 - IR

Yeah, I think so.

01:16:20 Speaker 4 -IS

We avoided the use of pfas.

01:16:22 Speaker 3 - F

I mean, I would probably still check if somehow we still use PFAS in the alternative?

01:16:27 Speaker 4 -IS

Yeah, but assuming there's no pfas in our alternative, everything is lowered right?

01:16:31 Speaker 3 - F

Yeah.

01:17:00 Speaker 5 - IR

Yeah. So for production there should be a big one here, right?

01:17:05 Speaker 4 -IS

That's probably like the red one.

01:17:19 Speaker 4 -IS

New potential risk?

01:17:20 Speaker 5 - IR

There's new potential risk, right? That there's like obtaining aluminum is also not the cleanest.

01:17:32 Speaker 4 -IS

It's more a new form of environmental impact, yeah, so.

01:17:35 Speaker 5 - IR

And it's probably maybe also costing more energy to produce stuff like that. So I would say, yeah.

01:17:39 Speaker 4 -IS

Very energy intensive.

01:17:44 Speaker 3 - F

And then I also would still wonder like would it be just the aluminum or do you need some additional layers?

01:17:54 Speaker 3 - F

Yeah, I don't know if usually it's just 100% aluminum right? Or if it is a mix?

01:18:16 Speaker 5 - IR

I've also heard that if you heat food in aluminum it can be bad?

01:18:17 Speaker 5 - IR

like these old camping fans, I still use them because I'm like, well, I'm only using them like a few times a year, so it's it's probably be fine, but you shouldn't use them regularly I think

01:18:28 Speaker 5 - IR

OK. Yeah. But I don't think that's a risk now with because you're not gonna heat your food I guess

01:18:44 Speaker 1 - J

Yeah. Yeah. But but maybe maybe it's good to mark it as you don't know, right? Like if this is, if this could be a risky scenario, then you can mark things that could happen. So right now we're only talking about hypotheticals, right? Like we we're only talking about well like we.

01:19:03 Speaker 1 - J

Decided to use aluminium but we are not sure aluminium is safe and in which stages are we not sure aluminium is safe?

01:19:12 Speaker 3 - F

Well, it could be that once we we replaced it, then maybe people would start maybe heating it up. So before if you will get that paper container, I will never put that in the oven. But then let's say I bring it home, and can easily think of reheating.

01:19:13 Speaker 4 -IS

Yeah, what if people put it in the microwave..

01:19:33 Speaker 1 - J

Yeah. What do you think about trade-offs? Do you see any other problems with this? So trade-offs would be things like OK, it's cost increased a lot or the performance is lost or.

01:19:48 Speaker 4 -IS

Yeah, I think in definitely when it comes to.

01:19:50 Speaker 4 -IS

Costs, it's probably more expensive.

01:19:55 Speaker 4 -IS

The wrappers have to be produced by a new supplier.

01:20:03 Speaker 3 - F

Where would we indicate this consideration?

01:20:05 Speaker 1 - J

Yeah. In this box over here. Yeah, yeah, yeah.

01:20:19 Speaker 4 -IS

If you want to make use of the excellent recyclability of aluminum, we also need to make some effort in speaking with some recycling partners...

01:20:29 Speaker 1 - J

Yeah, and how to get, yeah, how to deal with the food contamination.

01:20:36 Speaker 3 - F

Probably also I wonder about the weight. If it's heavier than the original package..

01:20:43 Speaker 4 -IS

Transport and maybe also the size, because we're going to it's an aluminum plate, right? Or both if it's a plate and it can be stacked.... You don;t want it to be more voluminous than the flat paper.

01:21:08 Speaker 4 -IS

Yeah. Yeah. So transport and storage is less efficient, yeah.

01:21:18 Speaker 4 -IS

So in also in this case the collection is important. People should know to throw it away in the correct bin.

01:21:39 Speaker 1 - J

OK. Well, that's that's all the steps that we're gonna go through today. Yeah. Like I said, I also give a little bit, I call it the iteration guide.

01:21:52 Speaker 1 - J

But again, it it feels a little bit foolish to.

01:21:58 Speaker 1 - J

Teach designers iteration. You know what I'm saying? So bear with me. The idea is to say, like, OK, so if your strategy was not, you know, safe enough. If your strategy did not have a good effect. So let's say that for PFAS, we went for the.

01:22:19 Speaker 1 - J

We keep using PFAS, but we only avoid people from touching the PFAS or from the food to touch the PFAS or something.

01:22:27 Speaker 1 - J

Then you would be addressing concerns in the use phase, but you wouldn't be addressing concerns in other stages. So here the recommendation is can you combine strategies? Can you also try to look into strategies that you can implement in in the, in the in the EoL phase or in the production phase or something. So it's combining strategies.

01:22:47 Speaker 1 - J

And and the combination of strategies or also applies for when you have uncertainty. So it's very common that sometimes substance is banned, but then they come up with a with a substitute and then the supplier goes like, yeah, but there is this substitute is not bad. So this one is safe and whatnot. But.

01:23:08 Speaker 1 - J

Is not necessarily safe or we don't know that it's safe, so uncertainty is a very scary thing and it's very.

01:23:17 Speaker 1 - J

Yeah, difficult to to.

01:23:23 Speaker 1 - J

To obtain all the data and also like of all of these chemicals that we use, we don't have enough data, let alone for the new chemicals that are that are that are coming and we're not in all of these substitutes. So when you are dealing with uncertainty, it's always good to create additional barriers. So in this illustration we have that we made this decision at a material or a substance.

01:23:43 Speaker 1 - J

Level so we substitute, but then there might still be emissions. So can you incorporate any strategies so any control strategies or reduced strategies in another level so at the component level for example, can you isolate that substance that you used and whatnot?

01:24:01 Speaker 1 - J

And the other one would be to combine strategies to fulfill all of these requirements. So sometimes a good example of this is the is the refrigerant I'm going to talk about this in the knowledge stream, but in refrigerators they use refrigerant gases that.

01:24:21 Speaker 1 - J

Have a high global warming potential, so if they're emitted into the atmosphere then that's a problem.

01:24:28 Speaker 1 - J

And now they're trying to use other types of gases, so inert gases, for example, to to have even a lower global warming potential. But these gases are flammable. So that's a new form of risk that you have to think about. So in this.

01:24:48 Speaker 1 - J

Diagram what I'm trying to say is like OK.

01:24:52 Speaker 1 - J

If we only use the strategy at a material level or at a chemical level, we have that there's a new refrigerant gas that.

01:25:05 Speaker 1 - J

Yeah, that fulfills the function and it's and and and and it's. Yeah, it's very efficient and whatnot, but it's flammable so.

01:25:15 Speaker 1 - J

Maybe we make a decision at a material level, but we also make a decision at a component level to be able to fulfill these three things. So then we tackle the flammability with the I don't know, through safety information or through a component that prevents this from happening, etcetera, etcetera.

01:25:37 Speaker 1 - J

So that's a little bit the the recommended.

01:25:40 Speaker 1 - J

Questions.

01:25:44 Speaker 1 - J

So now, yeah, I I would like to reflect a little bit. We can keep it short. So we can leave, I don't know like 5 minutes early and then skip the break.

01:25:56 Speaker 1 - J

Is that OK or do you want to take a break now?

**F) Discussion – Improving the method**

01:26:08 Speaker 1 - J

OK, so do you have any comments so far? Like what are your general thoughts on the methods so far?

01:26:21 Speaker 4 -IS

I always like having these worksheets that help you put your thoughts on paper, and I guess it helps with the formulation of problems and it makes things more visible.

01:26:35 Speaker 4 -IS

I like working with like step by step on these types of yeah templates...

01:26:44 Speaker 5 - IR

I think it's really nice that it's kind of if you are designing with this specific like question in mind, I think it's nice to have something that kind of that you can use to guide you through the process. I think I'm a bit concerned about it. Like of course, there's a lot of different elements.

01:27:00 Speaker 5 - IR

Yeah, to to to consider when designing products or how.

01:27:05 Speaker 5 - IR

Like if you would have like a method for all of these different things, how how? How does how are you going to deal with that?

01:27:18 Speaker 5 - IR

So that's a bit more what I'm trying to figure out, like how that works.

01:27:26 Speaker 3 - F

And maybe also in the trade off with other.

01:27:28 Speaker 3 - F

Sustainable strategies, right?

01:27:30 Speaker 3 - F

Because I think substances of concern, you cannot really quantify them through the LCA.

01:27:38 Speaker 3 - F

So what if we have to make a choice that enables one strategy, but then brings in another substance? Then how? What do we do there?

01:27:47 Speaker 5 - IR

But for example in the previous project you did. Did you assess this? No.

01:27:53 Speaker 3 - F

But I think it's also because this topic is something that I think so many people really feel uncomfortable with because there is so little knowledge around it right?

01:28:00 Speaker 3 - F

So I think it's already nice to have this sort of step by step approach.

01:28:06 Speaker 5 - IR

I think it's nice to have like, where do I even start like? That's nice...

01:28:13 Speaker 1 - J

Yeah, yeah, because because my next question to you and I think maybe this integrates nicely...

01:28:21 Speaker 1 - J

I I understand that right now how I gave it to you is like a OK, we're gonna go from A to Z approach. Yeah, this is not realistic in your professional practice. So my question to you is.

01:28:34 Speaker 1 - J

Do you think this could be somehow integrated? And how do you see it integrating into your design process? How do you think this integration would happen?

01:28:50 Speaker 5 - IR

You would probably need to start with one of the one of the steps where like in your process you can maybe.

01:28:57 Speaker 5 - IR

Make decision we cannot only make a decision based on the the PFAS right?

01:29:05 Speaker 5 - IR

So you have to, Yeah, maybe indeed, like focus on other sustainability topics or or even like the problem in general you have like so some like how?

01:29:14 Speaker 4 -IS

Or the user experience and stuff like that.

01:29:17 Speaker 5 - IR

Yeah. Yeah. So I think maybe.

01:29:21 Speaker 4 -IS

But that's maybe in the the trade-offs

01:29:25 Speaker 4 -IS

So I really also like the step where you reflect. So we chose a different approach, what is then the effect?

01:29:32 Speaker 4 -IS

Then what is the effect of that approach in other elements?

01:29:39 Speaker 4 -IS

But it's still very open question and.

01:29:42 Speaker 4 -IS

During a brainstorm, especially as like a last step of for example a 2 hour session, people are tired and yeah, things might be forgotten, right?

01:29:56 Speaker 5 - IR

When I see this, I'm like ohh yeah, this is something I should think about when I'm designing a product.

01:30:00 Speaker 5 - IR

But then I'm also thinking what other things I need to think about when I'm designing a product.

01:30:05 Speaker 5 - IR

I almost just want like a box with cards where I could just have all the questions I need to ask myself or something to verify, did I consider this, did I consider that...

01:30:14 Speaker 1 - J

Like a checklist. Like oh, did I consider this? Yeah.

01:30:24 Speaker 3 - F

The problem is not really to integrate this in our like process. The problem is to actually have priority on that topic, right? So if the client asks for it?

01:30:31 Speaker 5 - IR

I know that the topic is there. Yeah, but like if you never heard of it. It's really hard to design for it because then you're not prepared...

01:30:36 Speaker 3 - F

Of course, yeah.

01:30:45 Speaker 3 - F

But let's say going forward. So now knowing that this should be a priority, then as soon as it's part of the brief right, and if it's not like we can advocate for it, but as soon as it is agreed that it's in scope, then I don't think it's difficult to integrate this because we always have the exploration phase where usually look at a lot of things and we could look at this as well.

01:31:04 Speaker 1 - J

Yeah. So this could be another box in the exploration phase.

01:31:07 Speaker 3 - F

Just another topic that we are assessing and then now we have synthesis right where we collect all the insights that we have. And so we have all the trade off right.

01:31:17 Speaker 3 - F

A lot of other topics that needs to be considered as well and then this is simply ideation, right? So it's about taking this into account when we create new concepts and of course we are taking into account millions of other things, but this could be another thing on top.

01:31:33 Speaker 5 - IR

I think I know what I'm a little missing is.

01:31:39 Speaker 5 - IR

How to assess?

01:31:41 Speaker 5 - IR

If there is a problem with the, maybe you're redesigning a product, maybe like a coffee machine or something like that.

01:31:47 Speaker 5 - IR

That's.

01:31:48 Speaker 5 - IR

Way more complicated than.

01:31:49 Speaker 5 - IR

Than the wrapper.

01:32:20 Speaker 5 - IR

Like, is there a way to like maybe do quickly assess?

01:32:24 Speaker 5 - IR

If there would be a problem in.

01:32:26 Speaker 5 - IR

The products or design or redesigning or.

01:32:30 Speaker 3 - F

Well, I mean the the problem I see, so the limitation I've seen this work is that this makes complete sense, right? This is the steps you have to do. Yeah. But then I feel I'm still lacking the tools that enable me to do these steps properly. So I think most of this, let's say, the last part I feel is just the.

01:32:48 Speaker 3 - F

Design process, right? So you start identifying problem. Maybe something that is new, more around life cycle. But we do it for other things, right? So for other topics we look.

01:33:00 Speaker 3 - F

The entire life cycle and we look where we have the biggest issues, then we need to weigh the issues, right. So how big of an issue is in each of the phases so that we know where we should focus. Yeah. Then we look into alternative strategies and I feel that this could also be applied to other topics as well. Then we develop solution and then we assess all right....

01:33:20 Speaker 3 - F

Is this solution better than the one before, so I feel overall I don't know if I see this process as being only the substances of concern, right? This is a bit that design process.

01:33:31 Speaker 3 - F

Yeah. And then we have this big step at the beginning, which I think is pivotal to make the right work. And I think it's great to already have questions that make you think about what you would need to look for.

01:33:43 Speaker 3 - F

But my question is still how do I get those information? Because I think that that's right now the biggest issues we have.

01:33:51 Speaker 4 -IS

That's quite difficult, but there's also because it's a new topic.

01:33:58 Speaker 4 -IS

Or it is now growing, so there's not that much information available right?

01:34:00 Speaker 4 -IS

So you have to work with what is there and there isn't a lot...

01:34:07 Speaker 4 -IS

And then you have to make assumptions right?

01:34:09 Speaker 1 - J

Yeah, that's that's that's important that you mentioned because it's, it's, it's unclear to me that there's a big question about uncertainty. So sometimes you don't know and sometimes you make decisions with only...

01:34:23 Speaker 1 - J

a couple of pieces of the puzzle, and as a designer, sometimes you have to make decisions still, even though you don't know the whole picture, and then you go into a phase where you make something with what you had and then you obtain more information. So within the iteration rounds you may obtain more information about certain things.

01:34:43 Speaker 1 - J

But indeed, my big one of my big questions is.

01:34:48 Speaker 1 - J

What level of uncertainty is acceptable in these kind of things? You.

01:34:55 Speaker 5 - IR

I'm not sure, but like here you're gonna. You're gonna assess the full bill of material. So you're really like top down.

01:35:06 Speaker 5 - IR

I'm wondering.

01:35:09 Speaker 5 - IR

Because you already mentioned some things, I think it's the same with maybe for design for repair. There already things you can probably guess from like for example this is cooker, it's going to heat stuff. So probably there is an extra. So is there like a way that you can maybe even before before step 0 or maybe during step zero kind of OK.

01:35:30 Speaker 5 - IR

So maybe be extra aware of. Yeah, products that have heating elements or products that are in contact with foods or maybe products, parts that are flexible. I think you can maybe already.

01:35:43 Speaker 5 - IR

In that way you can do like a very quick assessment of, OK, what are the biggest risks or what are potentially risks?

01:35:50 Speaker 1 - J

Yeah, or where to look? No, because instead of looking, there's a water cooker. Instead of looking at the whole components of the water cooker, you can just look at the OK, the container that is in touch with the water. No, because it's going to go into someone’s body.

01:36:04 Speaker 1 - J

And the piece of metal that goes into your water as well. Yeah, OK, I understand.

01:36:09 Speaker 5 - IR

I'm I'm thinking like how can you make it, especially in the ideation phase you don't know all the materials but you can think of it as upfront what what kind of choices kind of goods.

01:36:24 Speaker 5 - IR

Sometimes you're still designing the products.

01:36:32 Speaker 5 - IR

But you already know some, maybe things that are part of the product like heating or it's it's food, or maybe the kids are going to put it in their mouths or I don't know.

01:36:44 Speaker 3 - F

Maybe be interesting, but it will require a lot of effort in time, but to create the database right? So if you are designing this product.

01:36:52 Speaker 3 - F

You can select it and then you have a sort of data sheet telling you. Usually this type of product like coffee Maker. You have to be careful.

01:37:00 Speaker 3 - F

With this element that element because.

01:37:01 Speaker 3 - F

We found that most of the time there is a substance.

01:37:02 Speaker 5 - IR

Yeah, yeah. Or just like elements in contact with food or elements. Although of course if you're designing projects like that you always trying to be concerned with this or that...

01:37:13 Speaker 5 - IR

I think there are more rules for kids toys than for other products. For example, because kids can choke or something...

01:37:26 Speaker 5 - IR

So maybe it's already part of the design process, if you're designing for a thing like that.

01:37:29 Speaker 1 - J

Yeah, there are standards already in some in some things, but, but indeed sometimes there's standards for for things that you just give give for granted, but then there's suddenly not a standard for PFAS going into your mouth. So your burger, you know what I'm saying, like then? Yeah. So I think it's still good.

01:37:46 Speaker 1 - J

To to bring it up from a substance of concern perspective. So this is really nice comment.

01:38:00 Speaker 5 - IR

Cause maybe I can think maybe there are substances of concern in the container, right? There's water I'm going to boil in it. I'm going to use it for years, and maybe used every day. But maybe because you did this then you know already, what kind of substance of concern might be in there? And then you can maybe be more focused.

01:38:22 Speaker 3 - F

Also for the parts that are in contact with very hot elements, probably you know, like a "watch out" for flame retardants, because probably there are some retardants or maybe parts that needs to be really strong and resistance to wear.... watch out for additives that make theme stronger....

01:38:36 Speaker 3 - F

So I think overall the question list is useful. But yeah, this is what we really need (pointing at the information sheet from the case).

01:38:45 Speaker 4 -IS

But I also I feel like you could potentially use this process to fill in some knowledge gaps, so ideally you'd walk through this process with an expert. on pfas or SoC and ask them these kind of questions, or show them your analysis.

01:39:05 Speaker 4 -IS

And then you can fill more of those knowledge gaps and start forming a database with that information.

01:39:24 Speaker 1 - J

I have one more question, do you think this can be integrated into professional practice and well, we talked about it a little bit, but.

01:39:34 Speaker 1 - J

What what would be the challenges of integrating it in professional practice?

01:39:38 Speaker 4 -IS

I think so. I think there's multiple applications. So first of all, you could use this process as a way to educate people. So for example, today I learned a lot about PFAS. So you could use it to educate your colleagues.

01:39:55 Speaker 4 -IS

Maybe you could even do like a client workshop to also spread awareness about substances of concern with them. And I think he also touched upon it like these are quite, yeah, they're they're very close to what we usually do, right. So this is research or analysis.

01:40:15 Speaker 4 -IS

phase... then there's a bit of synthesizing and then we go into ideation, so I think.

01:40:20 Speaker 4 -IS

Integration should be quite easy, but then there's also other factors that have to be taken into account with the user experience, costs, etc.

01:40:34 Speaker 3 - F

Yeah. Again, I think if we would have this, I would start sending millions of emails tomorrow. You know, I think this is the process. So the process is clear. We can do it, but we need the information.

01:40:49 Speaker 3 - F

That I think is really the holy grail, because that will make accessible informations that currently are not accessible. I don't know. I think so many clients will be so interested so interested in that.

01:41:00 Speaker 3 - F

That if we could propose, we can do a hazardous substances scan of your product.

01:41:05 Speaker 3 - F

I can imagine so many clients being like, yeah, let's do this. They also have no idea about this topic, right? So they are looking for certainties from us.

01:41:14 Speaker 3 - F

If we propose them, let's go through a process where we try to map out and discover things together.

01:41:23 Speaker 3 - F

I think I don't know if the the the interest would be as high.

01:41:28 Speaker 5 - IR

Would would there be a way to integrated with like an LCA or like a tool like that?

01:41:32 Speaker 1 - J

Well, what? What's out there is risk assessment. So you have you have environmental risk assessment and.

01:41:44 Speaker 1 - J

Yeah, LCA doesn't cover this, but risk assessment does. And what risk assessment focuses on is also looking into each one of the stages and then seeing like who is at risk, what are the limitations, what is the limit dosage you know. So if I give you 10 grams of PFAS, maybe you're fine. If I give 10 grams of PFAS to a child then it's more risky.

01:42:10 Speaker 1 - J

And then they look at who is affected and in which ways do these substances behave as well. So for example, things like how is the substance affected in the context? I I found very valuable in my research. I was like, oh, \*\*\*\*, OK, yeah. The substance is there.

01:42:30 Speaker 1 - J

But it turns out if you use it in the heat, it's really bad, but if you use it in the cold then it is not as bad.

01:42:34 Speaker 1 - J

So some clues like that started.

01:42:39 Speaker 1 - J

Yeah, sparking all of these steps where you, like, try to break down the problem of your particular product into pieces. Yeah, but.

01:42:52 Speaker 1 - J

Risk assessment would be the way, but risk assessment requires a lot of data that is not always available, same as LCA. It requires a lot of of data and it's very long process and it's a very tedious process at the moment, so it's difficult. When you're doing this (points at wheels) you're doing a very qualitative form of RA

01:43:18 Speaker 1 - J

Cool. Do you have anymore comments? Because we're nearing the end.

01:43:24 Speaker 4 -IS

The things that you wanna let me know?

01:45:01 Speaker 1 - J

Yeah. Thank you so much. I hope some of these things are insightful. I hope. Yeah. I think some of these resources, if you have the time, I think you might find interesting.

01:45:14 Speaker 5 - IR

Yeah, I think maybe like this you use if you want to do a very extensive like evaluation of your product, but I think I think maybe quick ways I think. Maybe not quick ways but maybe focusing on tackling the biggest issues...

01:45:33 Speaker 3 - F

Actually, I'm also thinking maybe we should chat with the LCA team. I wonder if maybe they could help out.

01:45:40 Speaker 3 - F

So because they always request all this data out also from the BOM check. So maybe there are data that even if they don't consider they have.

01:45:52 Speaker 1 - J

Yeah, cool. Yeah. So thank you.

01:45:59 Speaker 3 - F

Thanks to you.