

#005 Concrete motorway safety barriers

Marten Hiekmann

Walls do not always just stay the same after crash. That's for sure there's something happening energy and the world is breaking apart as well as the cars destroyed. So there must be some kind of how do we repair it now and the cost for that is cannot be a cheap solution because what if a block of concrete falls out of the wall? How do you replace it? You just put some cement on top of it and then say it's fixed or does the wall break again at the same point after the initial crash, then you fix it and it breaks at the same parts again that you just tried to kind of repair by gluing it...

Mateusz Furs

You listen to Marten Hiekmann, General Manager of PASS+CO INTERNATIONAL who is our guest today.

This is the 5th episode of Concrete Injection Made Easy.

But first some music.

Marten and I dive into the use of concrete barriers on motorways, as well as the dynamics of damage to concrete barriers due to corrosion of internal reinforcement and concrete degradation due to carbonation.

We also get into what the future holds for roadside concrete barrier repair.

I hope this episode is food for thought about whether there's a better way to repair damaged concrete barriers than replacing huge chunks.

Make sure you hit subscribe if you haven't already and sit back listening. Let's do this!

Mateusz Furs

I just wanted to tell a quick story to our listeners, how we met and how I managed to invite you on the show.

Marten Hiekmann

I, first of all, thank you very much that I can be part of this podcast. I think it's a great idea.

Mateusz Furs

So I don't know if you remember, but we met five years ago in 2015. In Poland. That's correct. Yes. That was the far in Canada, and the third cold autostrada in Polish at highway in English. I was just you know, going around to see if there is anyone to talk about my co paratrooper and injection business to find a client, maybe someone interesting. And then I have found your company and we had a great conversation at the time and so Yeah, and five years later, we see each other in front of our computers. And to have this discussion about safety on the roads, and the concrete safety devices that are being used worldwide and everywhere actually everywhere. Really, everywhere we drive. So how do you find these concrete devices?

Marten Hiekmann

I think it's great how you remember that we met five years ago at Targi Kielce.

it was a great pleasure then and I didn't think that we will talk again, but it appears that the topic of concrete works, is still and was an important topic. We as PASS+CO are in family business, one of the oldest in Germany manufacturing, assembling and setting steel barrier systems. Me personally, I'm the sixth generation of the family business running the international business. And, and our knowledge globally is pretty big, unfortunately also about concrete barriers, road safety barriers that popped up over the last five to 10 years more and more in different countries, including Germany, where where they have been assembled on the roads, and we are looking from the side of road safety to this devices. I remember when we talk five years ago at autostrada Expo, where we go every time this year it got obviously canceled because of the pandemic situation. But I hope next year we can go again to Kielce to participate. And I remember we were

talking a little bit about what happens with the concrete. Why are the cracks in the concrete and How may you be able to repair them or fix it? And I think that this was very interesting when we discussed it. Nowadays, we of course, were blocked by concrete walls for our market where we found that road authorities have poured concrete barriers more and more on the road. And we we had to start thinking about what is the advantage or maybe disadvantage of a concrete barrier for roadside?

Mateusz Furs

I invited you because, well, my business is concrete, that's for sure. And concrete repair, and injection. And so I had to ask this question. And how often do you see that this passive safety devices are destroyed? And what do think about this concrete being used for this purpose meaning safety devices are made of concrete.

Marten Hiekmann

In Europe or maybe in the world, you can see mainly two different types of barriers. One that is called Institute barrier, which is a concrete road safety barrier that is manufactured on site that means a truck with Simon puts the seminar into a form. And out of this form comes a concrete wall that is manufactured on the road side. And the second one which is a prefabricated concrete barrier that is produced or manufactured somewhere and then brought by blocks to the road and put together when we started looking into the topic of road safety barriers out of concrete. We found especially in this institute barriers that were manufactured on site, a lot of cracks and the holes that you can see just by driving just by passing by The wall and you can see them actually quite a lot, maybe not when the wall is very new just put on site. But after a while, after a couple of months, you can really see that it looks damaged it look dirty, it look as if something is happening with this war that may come from the outside or from the inside. And if you look at the if you ask me about the amount of the quantity of how often do we see this? Unfortunately, we see that a lot.

Mateusz Furs

I agree and this is this is the reason why I really invited you because I drive a lot around Paul. And every time I drive I see a situation that this concrete wall are destroyed. So my question was, is there if there is a business for me to make it through power, and but frankly speaking, I don't see very much that this was our being part of the one While in one place. And the other point is that I don't see it being injected for sure. So this is rather surface surface protection and a little bit from from here and there. You can find some surface repair, but it's very erratic, I must admit. And yeah. So speaking about this damages, does it affect any safety on the road? If this concrete wall is all destroyed?

Marten Hiekmann

That's a good question from the view of safety, you would always look into a safety barrier is something that takes energy into the system and redirects the car obviously, because that would crash on the road, or drop or any other vehicle to take this energy and the softly redirect the calm To the road. Now why is it so important? Obviously not because of the car but because of the equal passengers that sit inside the car. That will not take an impact that easy. And seeing impacting a car into a wall is a little bit like throwing an egg against against the wall.

Mateusz Furs

Yeah, it's

Marten Hiekmann

it's very rigid the system, the vehicle passenger may may have heavier impact than on something that is more softer. In this case, we have in Germany in association or an initiative that is called nachgeben.com which I would like to mention because they have a lot of information about cooperation between different systems, mostly steel and concrete showing what happens if you crash into a concrete wall. And what happens if you crash into a steel barrier? For us in the last 10 years that we have looked more and more into the situation with concrete walls, we believe that there is a measurement for vehicle passenger safety that is even in the harmonized norm in em 1317 The so called acceleration severity index as the level that is very rarely giving a very good result on concrete walls and just middle levels of safety was steel various systems give a very high safety level on this measurement. So, I think that should be taken into account and we have to

ask ourselves, why do road authorities not use a softer system for the safety of vehicle passengers but put everywhere concrete walls, which we do not understand why they would be. Do that it is about the safety for okay.

Mateusz Furs

Yeah, I see just reminded a story I heard this maybe 20 years ago in Polish radio, there was an engineer of safety on the road invited to the radio and the conversation was more or less about the safety on the roads in Warsaw, Poland. And he gave an example of a road that is being connected from the two lines are connected into the into one. And this connection is held in this way that only the car driving the one of these two slides can see what is going on on the road. And, and this car is is like allowed to drive faster than the other. They pulled this concrete wall to separate these lines, 100 meters to, you know, to prevent the accident that there are two cars going to this one line in the end at the same time. Yes. And this guy said that it has to be concrete because it puts into the mind of this driver who drives faster and who sees the road better that if something wrong, this is the the first his fault the accident took place and if something is wrong, he goes to this directly to this concrete wall, not the other one. So this concrete wall was about to you know, to keep sight of the driver and the car of his who was not able to see the whole road and definitely who be able to do anything to avoid the accident. So, his idea was basically that this concrete wall prevents car accidents. And you say that there are some better ways to prevent car accident.

Marten Hiekmann

I think from from from from your example that you mentioned the need that whoever has put the wall there the need for for them was to put it as an anti glare protection. Basically the one car cannot see the other side not get attention changed or something be be attended to where they're driving, don't look on the other side. This has nothing to do as the product being a road safety device, but more that the wall should separate two lines. In that case. There's different products that can provide this anti glare systems and plastic that you can install on top or, or other devices. But from a road safety side view, this has nothing to do with it putting a concrete wall there and then saying now we separate this. It's the same argument and when they say well, you know, only concrete wall can protect the road users from trucks breaking through the system that is standing there in the in the medium, for example. And that's just not true because we have very good steel system that are softer, giving more safety to lighter vehicles and also keep away or block trucks and heavier vehicles to crash through the barrier in the medium. So it's, it's more adventurous for vulnerable road users in our opinion.

Mateusz Furs

Speaking about this destroyed concrete walls we just agree that we see it often. I drive around Poland to drive in Germany, I assumed it also in many different European and other continents country. So you see this concrete wall destroyed. Do you see it also being repaired?

Marten Hiekmann

Um, that's that's a good question because the advantage of the concrete barrier that's already set by a concrete road barrier lobbyists is that it is very expensive only in installing it initially, but maintaining it is very cheap. So it doesn't really matter. You can crash into the barrier, you don't have to do anything. Obviously pictures that we have taken from road accidents, and that you can see on our website, and also I have sent you some of them. Walls do not always just stay the same after crash. That's for sure there's something happening energy and the world is breaking apart as well as the cars destroyed. So there must be some kind of how do we repair it now and the cost for that is cannot be a cheap solution because what if a block of concrete falls out of the wall? How do you replace it? You just put some cement on top of it and then say it's fixed or does the wall break again at the same point after the initial crash, then you fix it and it breaks at the same parts again that you just tried to kind of repair by gluing it I don't know how you how you want to do that. Very little has been done I think in this in this way, we have seen that the German road authorities bus tried to fix one in-situ barrier by putting a steel deck on top of the concrete wall to avoid as far as We understand rain or water coming inside the concrete wall. And then by, by in by connection with the steel reinforcement bars that are inside the concrete wall because it's just not only concrete This is steel reinforcements, but that at that moment when the water touched the steel and it corrosion starts or whatever chemical process it is inside, that this needs space and it goes to the outside and breaks the concrete wall from the inside. So, to avoid this,

Mateusz Furs

this is exactly what we were discussing five years ago, and I even answered some of your questions and this article is still online on your webpage. I checked before this conversation if it exists. It does. It's there, I explained there and then the corrosion products, corrosion of concrete and the corrosion of the steel walls are bigger in volume than the steel itself. So, there is this pressure of corrosion against the concrete and there is no concrete that can stay alive against to this pressure. That is why we can see so many concrete in general are being destroyed, and you can see the color of the three bars. This is exactly what happens on the road as well.

Marten Hiekmann

Yes, so this explains why there's the cracks inside the walls why it looks like it's kind of destroyed and it's not only looking like it's kind of destroy it. It's actually destroyed from inside. So it's kind of exploding on the inside. So how can you avoid such a chemical reaction?

Mateusz Furs

Well, there are surface protection for concrete that's for sure. But the surface protection won't work if the concrete wall is hit by the car or the or the truck. So it is it is cracked, it is destroyed. And the surface protecting won't do anything against this. So there are two possibilities are actually one, you have to remove this destroyed part and put another new one. And the same class. Am I right?

Marten Hiekmann

It's basically... Basically it's the same that we do with steel barriers you need to go inside, you need to stop the traffic for that work or you need to redirect the traffic to the construction site and construction site safety. Cut out this this damaged, let's say wall and replace it. Or if you have pre fabricated walls, you take out the ones that I hit and take new ones inside and connect it. We have a lot of experience on our highways, the outbound, especially on the A3, A4, A43 and A45 where you do exactly that. That the concrete wall is dismantling itself by chemical reaction from inside and with quiet, the government has just given a speed limit. So instead of driving on our well known autobahn as fast as you want, now you have to drive very slow because the safety barriers are not performing as they should, in case of safety. So that's also a way that the government finds now to tell us don't drive too far. Safety is not provided here correctly. So you need to drive less fast so that hopefully not too much is happening here. But that shows that the concrete wall is not working as it should as a safety barrier.

Mateusz Furs

You mentioned two types of concrete safety barriers. The ones that are produced are in situ and prefabricated. Which one of them performs better in terms of safety of our safety of our drivers safety and passengers.

Marten Hiekmann

From steel manufacturer view, I would say that none of them is really giving you what you want. You always need to ask yourself what what do you want from the safety barrier? What is it like you said Is it the anti glare? Is it that you don't want them to look on the other side? Is it to give it to be easy to maintain? You don't want to have so many construction sites. Is it that you don't want that you don't want a truck or car to drive through the road safety barrier because something is standing behind the Is it the school behind the something that you want to protect? Is it the building behind is it sign pillar behind it? Or do you want to give road safety to to the road users to the car He could passengers. And if that is the case, if you want to do that traffic safety, then in my opinion, you cannot put a wall there. It's it's not giving you what you are attending to do you want to protect the road users. And if you put the wall there, then you're basically doing more harm than putting a steel barrier.

Mateusz Furs

But still, we can see, as you mentioned a couple of minutes ago, that there are more and more concrete walls on our roads. you say that it's last five to 10 years. If I understood you correctly, do you do you think what's the reason for that?

Marten Hiekmann

I think that the lobby is very well positioned that a lot of construction companies have a lot of concrete to put somewhere and that they used to put now as a road safety barrier. I think it's a lack of knowledge, a lack of information, a lack of experience, this concrete walls are not there like since forever they just appeared and they are showing already that something is wrong, because they get this sample, even in situ barriers they get this sample kilometer wise they get assembled to be replaced. It appears that most of the roads authorities or customers prefer prefabricated concrete walls because this institute is taken away prefabricated walls are taken there. So, you go from one danger to the other. Yes. But we have taken pictures from an example of the A45 where Institute concrete barrier has been replaced and it took months if not nearly a year to replace the insert into concrete barrier on kilometres of roads and I think if you look at the pictures, it's obvious. Need to see that if things like this get replaced, you need to disassemble it. You need to put it somewhere that the concrete wall that is destroyed and it's not recyclable. So all this stuff is basically standing on the medium until the truck comes, put it away. Like if, like if you would assemble a house basically. And all the stuff that is in there is not really recyclable and it's dirt and it's in it's dangerous for the time being there is a construction site.

Mateusz Furs

Yeah, it is somehow possible to use it once again, but it's not easy. It takes time. I want to ask you about if you know how to maintain your repair to concrete, if you've seen it, but you said you actually you almost answered my question because you said that you don't see the this concrete wall being repaired and you rather see them being replaced. Is this the best way to repair the concrete to replace it?,

Marten Hiekmann

Well, I don't think it's very cost effective. Economically wise, it's probably very expensive. What we see sometimes too is when they glue over the cracks, so you haven't kind of it looks like a kind of paste or something with a glue over the cracks that are in the walls. But I don't think that more than that has been done. What we see a lot is that road authorities responsible roads, authorities are marking the cracks and giving them different numbers. So there must be a documentation about how many cracks are out there on the concrete wall. But obviously, we don't have this information. That's something for for road authority to answer from what we see they document a lot and I don't think that there is a perfect way or good way to maintain concrete damage.

Mateusz Furs

So you say that there Many many kilometers of this concrete walls be being documented and examined it and even marked and had you seen anything being injected I mean the crack injection and concrete crack injection has been held to fill this cracks with a kind of material

Marten Hiekmann

no not not for road not for road barriers, I see that they have the same problem in Germany we have the same problem now with all the concrete bridges that are also there you need to kind of repair How do you go there etc. On bridges is not that heavy to stop the traffic but four walls on the road site, you need construction site and put safety and that or this measurements that cost a lot. Yeah.

Mateusz Furs

So, how do you think that this kind of concrete repair could be Like What Did what does it take to repair it on site on the road?... Like, how many people at a time... you know technology, right temperature on the site, so, it can be too cold to repair concrete and it can be too cold to inject the concrete for sure. And like taking the consideration, this you know, traffic jam for kilometers as is waiting in line to pass this place where the concrete is being repaired or injected, even if we take it off. It's possible. I have no idea about this and I listed like five you know, points the this is disadvantages of concrete on the road.

Marten Hiekmann

Yes, I think that's a good question. I think that there needs to be more experience in how to fix that problem. For steel barriers, you know that we drive out within 48 hours we can repair the damaged parts of the steel barrier for concrete hours. This is the safety reasons Yes, exactly, especially in millions to be to be able to get the same performance of the road safety barrier that it

was before especially medians when when there's happening something you all roadside safety doesn't really matter. on the roadside, do you want that the level of performance is always the same and that should be done quite quickly.

Mateusz Furs

Okay, but you just said the concrete you know, situation they just put the sign speed limit.

So

Marten Hiekmann

that's, that's what

Mateusz Furs

they don't do it. 48 hours for sure. I mean, it's hard to believe that

Marten Hiekmann

at the same time they argue that a wall can be questioned more than once. That's the advantage of a concrete wall according to lobbyists saying that if somebody questions into a concrete wall the concrete wall is not really damaged, what is damaged for sure the car and maybe the vehicle passenger, but the concrete wall is top so that means less cost for people to go out there to repair the concrete wall less cost of putting signs and stuff like this for for construction type safety. But what happened with the car and what happened with the road is that that is not the problem or responsibility of the authorities.

Mateusz Furs

We just mentioned that there is 48 hours to repair this still burgers. And this is the like, they're also so taking your experience how long does it take to You know, rebar in the concrete from the time when the when the, you know, this accident was reported to the time when when this concrete wall is repaired or replaced if it's so, you know, heavy this destroyed?

Marten Hiekmann

Well first of all this depends on each tender by itself if if each job is specified, so it doesn't always have to be 48 hours it it could be and if it is then you sign to get the job to do that for installation assembling and maintaining for concrete walls it would be interesting to know because I don't think they do anything. If there is if there's cracks or if there has been a crash and parts of the concrete wall are falling out of the concrete work, they put a kind of sign in front of it and leave the concrete wall as it is and that can take a while We have seen this on the a three out of one on a five, where nothing is happening, pictures are available, I think you have them dirt is taken away after the crash, everything that will 30 is pushed away and the wall is just there and broken. If you need to ask yourself after a crash, there's maybe bigger parts of the concrete wall that fall out as well as the reinforcement bar, the steel bar inside the concrete wall is deform. So what can you do? You would need to go on the side and really cut out, I don't know couple of meters of this concrete wall and then come again with a truck with cement and report the hole in situ there.

How do you repair it? I'm, it's a good question. How do they want to do this? So as maybe they see that we cannot do this. They put prefabricated concrete walls there that in that case also you would have to drive out the way

Mateusz Furs

before I would have to answer this, how to do it using concrete. I will use prefabricated ones.

Marten Hiekmann

So for maintaining maybe yes, but you still have to look from the roadside safety view and the safety of the passengers where you would say, well, neither of this system really give us an advantage. But maybe there is maybe in future maybe you come up with a solution to fix fix this problems with the concrete walls.

Mateusz Furs

Well, I invited you for this for this podcast to discuss the you know, the amount of concrete needed to be repaired. The ways you've seen it repaired, you know, this, like maybe your ideas

that this reparation can be called in a better way. I mean, I was I was thinking that I was thinking that this is the actual topic of the of the conversation, but now we just, you know, change it into a situation where we both agree, the perhaps the concrete is not the best material to be used for our safety on the roads. Really.

Marten Hiekmann

I think what for this for this definitely, but then there is this point where you where you would come up and say, Look, we want to protect an area here. And that's very important to protect the area because if something happened to this area, things could be worse. Now let's say there is a building, there's people inside there, if a truck drive into that building, that's really damage. That doesn't matter about the safety of the vehicle passenger but much more people could be harmed here. So therefore, you put a concrete wall to protect this area. But in that case, you have to say that you want to protect this building. The sign this pillar is whatever it is that you want to protect, but don't call it a road safety barrier, which attention to say, road road users. So yeah, that they're there. I agree with you to about this.

Mateusz Furs

I wonder what our listeners say and what is their opinion on this, because even though this is the Concrete Injection Made Easy podcast and we are talking here about the concrete injection and the concrete repair topics. This is, you know, a great occasion for all of us to take under consideration if we drive and if we are a company owner, we drive a lot. If we are the site's rep, we drive even more if we are, you know, someone who just drive to work every day. So we drive out worldwide and we The highways, we pass concrete all the time everywhere bridges. And this as we as we just said, passive road safety devices, we just pass them all the time. So this topic really affects all of us and it affects all all our, our safety. So I really am really curious about people's opinion on this. on this topic, if you were, you know, to ask a question to our listeners and to find the European Union, what will be your question, I really must ask mine. What is what is your question?

Marten Hiekmann

I would like to know, how do you feel when you drive on the road? And you think about that something could happen. Obviously when we drive on the road, we are not thinking About a we will crash. That's always a big disadvantage for anybody who has to argue about road safety barriers is please use my product, but who wants to choose a road safety barrier? Nobody wants that. But in case that something happens, so if you obviously and clearly think about if something would happen, how do you feel driving next to a concrete wall or a steel barrier? None of them. You can't really say, Well, this is positive, I had an accident and hey, I crashed into this and that you can never say that any of this is something good an accident is probably always something very bad. But if you try to think about it and drive between these concrete walls, how do you feel safer? Is it the steel one is the concrete one, and both has the advantage and a disadvantage but especially if we look in the topic of this podcast today. injection for concrete is a concrete barrier really something that we should use because we can maybe maintain We can't right now, but maybe in the future, and that would be great if somebody comes up with a with a solution for that, but we don't have it now.

Mateusz Furs

So I'm looking for a solution. I hope to get an email from someone listening to us. And then, hey, you just said in the podcast that there is no solution at the time. We do have a solution. So I'm looking forward to get the email. I will pass this email to you. They have made you both Finally, get to know this. And great, right, great, great. So there was totally different idea about how this conversation would look like and suddenly we are just about to finish asking this two important questions about your question. How do you feel driving right next to the concrete wall? And there is one more question actually How do you feel when you pass a place the accident place on the highway? And you see this car being, you know, destroyed? You see only the car. Obviously, maybe people were taken to the hospital.

Do we? Do we really take it? Do we really think that could have been us now? Crushing against this concrete? Yeah. So I wanted it to be still rather than concrete in this this case. Once again, even though my business is concrete repair. Yeah, thank you very much for the conversation. Thanks for finding the time

This conversation just is like 38 minutes. So this is a huge amount of information. And question asked to force us to think about our safety on the road. And once again, we are all drivers. So this is our lives and our future on the road. Thanks again. Thank you.

Marten Hiekmann

Yeah, thank you very much for having me. Sorry, it took a little bit longer than we thought. I hope this podcast is good for all listeners, and maybe raise some questions. We are therefore for a couple of answers. I think discussion could go far longer. But I appreciate that you took into account to contact and to be able to talk on this podcast and I'm open for any any more questions or anything else about the topic looking forward to some some some answers may be good recommendations.

Mateusz Furs

Just to let you know I'll put any details that you will be able to know get in touch with Martin Hiekmann. And as well, I will put his webpage link leading to his webpage. And some pictures we mentioned during our conversation there will be also available to have a look at the notes of this show for feel free. And this is inblock.com.pl/podcast. And this is where you can find this notes and the whole conversation. Thanks for listening. Thanks for this conversation.

Marten Hiekmann

Thank you very much.

Mateusz Furs

Bye bye. Thank you

What do you think about concrete road barriers? Do you see them destroyed? Do you repair it?

Can you provide some pictures?

OK, I hope you find this episode useful. We are waiting for your comments.

Thanks for listening, remember to subscribe. And I hope you tune in next time!