

## Copyright release: Supporting documentation

Exchange with the authors of reproduced materials concerning authorization requests to reproduce illustrations and figures:

**Figure 4 (also A-5): Illustration of TSD deflection velocity and deflection basin. Reproduced from Greenwood A/S corporate website.**

*Transcript of exchange with K. Jensen (affiliated with Greenwood A/S) with request to reproduce copyrighted material*

FEB 25

**Martin Scavone sent the following message at 1:15 AM**

Good morning, Mr. Jensen. I am writing to you once again to ask you about some content on Greenwood's website that has to do with the TSD. This time in particular it is about the illustration of the TSD measuring principle that shows on the website, I would like to reproduce it in my dissertation (proper credit to you or the company guaranteed) and for that, I ask for your permission to do so. Please do let me know if there's any concern in reproducing it and/or if I may need to ask someone else as well.

**Karsten Jensen sent the following message at 3:43 AM**

Dear Martin

You are very welcome to use the illustrations on the Greenwood home page as you request.

And also, as mentioned before, it shall be a pleasure to set up a video meeting to go through the TSD technology with the newest features and to update you with some new illustrations

E.g. from the illustration it might not be very clear - but max deflection is due to visco-elastic properties a little behind the load wheel - not right under the load wheel. Also, with the new high frequency lasers in the generation 4 TSD is it possible to locate discontinuities as cracks in asphalt and in concrete within an inch.

Kind regards

Karsten

**Martin Scavone sent the following messages at 11:09 AM**

Thanks for such a fast answer. I may be on a tight schedule over the next few days, but maybe I could arrange a slot for an interview with later on. I will get back in touch.

Happy weekend

**Figure 5: LTE Testing. Reproduced from Pierce et al., 2017**

*Transcript of exchange with L. Pierce with request to reproduce copyrighted material*

On Feb 15, 2022, at 5:02 PM, Martin Scavone <MScavone@vti.vt.edu> wrote:

Dear Dr. Pierce,

I am writing to you to request authorization to reproduce a drawing from a technical report authored by you (among others) on the topic of FWD use for pavement analysis and design within an M-E network – the FHWA Report entitled “Using Falling Weight Deflectometer Data with Mechanistic-Empirical Design and Analysis, Volume III: Guidelines for Deflection Testing, Analysis, and Interpretation”, from December 2017.

Particularly, I would like to get your permission to reproduce *Figure 15* - the diagram that illustrates the concept of Load Transfer Efficiency for jointed pavements. The reproduced picture will appear in the introductory chapter of my Ph. D. dissertation, which revolves around the use of the TSD for concrete pavement evaluation, among which an attempt to back-calculate the joints' LTE from the TSD's many deflection slope readings. Once completed, the Dissertation manuscript and supplementary materials will be released under a CC license.

I look forward to hearing from you. Please notify me whether I should also request permission to reproduce *Figure 15* from someone else, I'll send the question promptly.

Sincerely,

Martin Scavone.

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PS: I retrieved your contact information from the DaRTS mailing lists – I recall seeing you during the past meetings (I *joined the team* when DaRTS 14 took place)

Sent from [Mail](#) for Windows

**Re: Request to reproduce a drawing from a report authored by you**

Linda Pierce <[LPierce@ncenet.com](mailto:LPierce@ncenet.com)> Tue 2/15/2022 9:08 PM

To:

Martin Scavone <[MScavone@vtti.vt.edu](mailto:MScavone@vtti.vt.edu)>

Martin, I recognize your name from the DaRTs meeting, good to meet you. The great thing about FHWA reports, you do not need to request permission for use of any figures or tables. All that's needed is to reference the report from which the figure or table was taken. I think I may have a higher resolution image if needed, just let me know.

All the best with your dissertation.

Sent from my iPad

**NOTE:** As per the instructions given by the document's author, **figure A-2**, also retrieved from an FHWA report is authorized for reproduction.

**Figure 27: Doppler effect illustrations**

This figure was released under a Creative Commons license [CC BY SA 3.0], thus as per the license terms, they're authorized to be reproduced within the license terms (attribution explicit in figure caption).

**Figure A-1: RDT. Reproduced from Andrén, 2006**

*Transcript of exchange with P. Andrén with request to reproduce copyrighted material*

Från: Martin Scavone <[MScavone@vtti.vt.edu](mailto:MScavone@vtti.vt.edu)>

Skickat: den 16 februari 2022 04:37

Till: Peter Andrén <[peter.andren@vti.se](mailto:peter.andren@vti.se)>

Ämne: Requesting permission to reproduce figures from your thesis,

Dear Mr. Andrén,

I am writing to you to ask for your permission to reproduce two figures from your 2006 Thesis manuscript on the Road Deflection Tester [RDT] device. I am compiling my Ph. D. dissertation on traffic-speed deflection testing devices, and I stumbled upon the RDT while conducting my review of current and former devices. In particular, I would like to ask for your permission to reproduce (giving

you credit accordingly) figures 3.1B and 3.2 from your Manuscript; they would both go to my literature review compendium, which (along with the rest of my original Manuscript) will be released with a CC license.

Thus, I will be most grateful if you could reply to this request stating whether you authorize me or not to reproduce these figures. If, by any chance, I must ask someone else for permission to copy, I'd kindly ask you please give me directions on whom to contact.

Looking forward to hearing from you.

Sincerely,

Martin Scavone.

Sent from Mail for Windows

**From: Peter Andrén**

Sent: Wednesday, February 16, 2022 6:04 AM

To: Martin Scavone

Subject: Sv: Requesting permission to reproduce figures from your thesis,

Dear Mr. Scavone,

Thank you for your interest in my work. It's been a while since someone did that, so I'm pleased to see it still has some relevance – even if only as a historical reference.

To answer your question, sure. More formally: I hereby grant you the permission to use the attached images in your future publication(s). (I assume you prefer to use the attached images in color and with higher resolution -- if not, feel free to cut and paste from the thesis.)

As a sidenote: I have been working on a state-of-the art of the Traffic Speed Deflectometer (the Greenwood vehicle). Are you doing something similar?

Kind regards,

Peter Andrén

**Figure A-3: Raptor**

*Transcript of exchange with M. Winström and M. Tegin, from Ramboll (holders of all Raptor-related IP) with request to reproduce copyrighted material*

**From: Martin Scavone** <MScavone@vtti.vt.edu>

Sent: den 25 mars 2022 22:40

To: Maria Tegin <maria.tegin@ramboll.se>

Subject: Requesting permission to reproduce a Raptor picture in an academic document.

Dear Mrs. Tegin,

I am writing to you to request permission to reproduce any of the Raptor RWD device pictures that appear on Ramboll's web page announcing the beginning of the multi-year pavement network survey in Norway (src: Ramboll investigates roadways in Norway with Raptortekniken, August 2021 - Ramboll Sweden AB (cision.com) ). I am a Ph. D. student at Virginia Tech (United States), currently writing my dissertation on traffic-speed deflection devices. The dissertation's literature review chapter will obviously include some content on the Raptor, but until finding the linked news brief, I couldn't find any Raptor photograph that I could reproduce, hence my writing this request. Please take for granted that, if authorized to reproduce these images, proper credit to Ramboll will be given.

Moreover, during this web search for Raptor images, I stumbled upon a presentation by Mr. Martin Wiström on the Norwegian network-wide survey for an ERPUG conference (src: Rullande bärighetsmätning I norge med Ramboll raptor (erpug.org)) I wonder if a written report / article chronicling this experience also exists. If so, I would be most pleased to read through it and reference it from my Dissertation, so as to keep my review of the Raptor's state of the practice as up-to-date as possible.

I look forward to hearing from you. I remain in close contact should you require any further details from me.

Sincerely,

Martin S.

Martin Scavone Lasalle, MSCE

Graduate Research Assistant

Virginia Tech Transportation Institute | Center for Sustainable and Resilient Infrastructure

3500 Transportation Research Plaza

Blacksburg, VA, 24061

(540)-449-7423 | [mscavone@vtti.vt.edu](mailto:mscavone@vtti.vt.edu)

**RE: Requesting permission to reproduce a Raptor picture in an academic document.**

Martin Wiström <[Martin.Wistrom@ramboll.se](mailto:Martin.Wistrom@ramboll.se)>

Tue 4/5/2022 6:50 AM

To: Martin Scavone <[MScavone@vtti.vt.edu](mailto:MScavone@vtti.vt.edu)>

Cc: Maria Tegin <[maria.tegin@ramboll.se](mailto:maria.tegin@ramboll.se)>

2 attachments (2 MB)

RaptorRNO2021\_3\_NoGPR.JPG; RaptorRNO\_NoGPR.jpg;

Hi Martin!

Thank you for reaching out, I got this forwarded from Maria and I'm replying directly to you to establish a direct contact.

We are more than happy to provide you with what you need, let it be pictures or any other information on the Raptor. I'm attaching a few images that you can use already now (you can put me and Ramboll as reference if need be), and can provide more info as needed.

I'm actually at the APT conference in Nantes, France right now with colleagues to you from Virginia Tech (Gerardo), and we are having a demo of the Raptor on the test site at the University Gustave Eiffel tomorrow. Are you by any chance coming to the RPUG in Saratoga Springs in the end of the month? We will be there, so that would be a good chance to meet in person.

Otherwise I'm happy to set up a teams meeting to answer all questions and supply you with material.

Let's keep in touch,

/Martin

Med vänlig hälsning

Martin Wiström

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Ramboll

Lokgatan 8

211 20 Malmö

<https://se.ramboll.com>

**Figure A-4: 1<sup>st</sup> Generation TSD. Reproduced from Müller and Roberts, 2012**

*Transcript of exchange with W. Muller with request to reproduce copyrighted material*

**Wayne Muller**

**Civil Engineer & GPR / NDE specialist**

SEP 17, 2020

**Martin Scavone sent the following message at 7:38 PM**

Dear Dr. Muller,

I'm contacting you to ask for your permission to add some images from a 2012 paper of yours into a literature review on the TSD I'm writing for Dr. G. Flintsch as part of my Ph.D. research progress. Please reach back to me with your response.

Sincerely,

Martin S.

**Wayne Muller sent the following message at 7:38 PM**

Hi Martin, Sorry, I hadn't checked LinkedIn in ages and only now saw your message. If it's not too late, is there still something I can help you with? Regards, Wayne

SEP 30, 2020

**Martin Scavone sent the following message at 6:09 PM**

Thanks so much for responding! My request is actually pretty basic: I would like to get the pictures of the Danish TSD that appear in the paper of yours in which you introduce the AUTC method to integrate the deflection basin and use them in a paper of mine (I'm starting my Ph.D. dissertation on the TSD, and I can always use some colorful pics). In order for me to bring them in, I may need to get your written permission. Thus, if you don't have any complaint about me using your pictures in my paper (proper citations for granted), please tell me so. In that case, I'll prepare a small paragraph explaining which pictures I'm asking permission to copy for you to review and approve and then for me to keep as proof. I'm on a tight deadline right now but I may prepare such doc. by the next week.

I'll reach back to you at some moment the next week.

**Wayne Muller sent the following messages at 8:48 PM**

Hi Martin, I presume you are referring to: Muller & Roberts (2013), "Revised approach to assessing traffic speed deflectometer data and field validation of deflection bowl predictions" - Its absolutely fine for you to use the pictures from that paper. There was a later ARRB conference paper that considered the same analysis approach from a slightly different viewpoint, which might be of interest (<https://trid.trb.org/view/1335651>). FYI, a few years ago I applied these analysis methods (with some refinements) to heavy duty AC and composite pavements in NJDOT while I was working in the USA for Rutgers CAIT. As part of that work we undertook some FWD comparisons (historical FWD results, not precisely aligned) and tried some structural number calcs etc. It actually worked rather well, despite the alignment between FWD and TSD being approximate and the measurements being undertaken at different times of the year (ie temp differences). If course the error in the TSD measurements has a more pronounced effect (especially for outer lasers), as the deflection values are so much smaller (compared to flexible granular pavements we usually test in Australia). I could put you in touch with some of my former Rutgers colleagues, if it helps.

**Figure A-7: MWD. Reproduced from Kamiya et al., 2019.**

*Transcript of exchange with K. Kamiya [Nexco Central Japan] and A. Kawakami [PWRI] with request to reproduce copyrighted material*

From: Martin Scavone <MScavone@vti.vt.edu>

Sent: Wednesday, February 16, 2022 12:56 PM

To: 神谷 恵三 <k.kamiya.ab@c-nexco.co.jp>

Subject: FW: Request to reproduce pictures from a paper of yours into an academic report

Dear Mr. Kamiya,

I am writing to you to request your authorization to reproduce two figures that depict Nexco's Moving Weight Deflectometer [MWD] prototypes – both the pickup-truck and the minibus-mounted devices, as part of a review of the state of the art in traffic-speed deflection measuring I am conducting towards my Ph. D. dissertation. I got to know the MWDs by reading the paper you (and others) authored for the 26th World Road Congress (I think it was in 2019?), I retrieved the pictures I'd like to reproduce from that paper [it's Figures 2 and 14].

Thus, I would be grateful if you could reply to this request stating whether I can copy these pictures or not, and in the event I should also ask somebody else for permission to copy, you would kindly instruct me on who should I write to.

I look forward to hearing from you.

Sincerely,

Martin Scavone.

**RE: Request to reproduce pictures from a paper of yours into an academic report**

神谷 恵三 <k.kamiya.ab@c-nexco.co.jp>

Wed 2/16/2022 8:53 PM

To: Martin Scavone <MScavone@vti.vt.edu>

Dear Mr. Martin Scavone,

Thanks for contacting me.

It's very honorable if my past article is a bit helpful with your PhD. research.

Since I need to confirm to all related personnel with the paper, please send me the pdf copy of your requested paper. Or please let me know the exact web address so that I can reach my paper. In fact, I didn't know about it after the Abu Dhabi Conference.

Sincerely yours,

Keizo KAMIYA, NEXCO Central Headquarters, JAPAN

**RE: Request to reproduce pictures from a paper of yours into an academic report**

Martin Scavone <MScavone@vtti.vt.edu>

Wed 2/16/2022 8:55 PM

To:神谷 惠三 <k.kamiya.ab@c-nexco.co.jp>

Dear Mr. Kamiya,

Thank you very much for your reply. As requested, here's the paper that contains the illustrations I would like to reproduce.

I look forward to hearing from you soon,

Sincerely,

Martin S.

Sent from Mail for Windows

**FW: Request to reproduce pictures from a paper of yours into an academic report**

神谷 惠三 <k.kamiya.ab@c-nexco.co.jp>

Wed 2/16/2022 10:23 PM

To:Atsushi KAWAKAMI <kawakami@pwri.go.jp>

Cc:Martin Scavone <MScavone@vtti.vt.edu>

Dear Mr. Kawakami

Attached is a copy of the paper which I submitted to the 2019 PIARC Road Congress in Abu Dhabi. Yesterday I received an email from Mr. Martin Scavone of Sweden's VTTI, requesting he needs authorization in introducing the two photo copies contained in the paper for his PhD. research. The photos are Figures 2 and 14.

As you understand, both of the vehicles belong to the PWRI. I believe all individuals who contributed to the research will not object to Mr. Scavone's request, if the PWRI permits it. Since this paper's co-author Mr. Terada already retired, I have contacted you of this case.

Please kindly reply directly to Mr. Scavone of his usage of the photos.

Sincerely yours,

Keizo KAMIYA, NEXCO Central Headquarters, JAPAN

**【機密性 2】 RE: Request to reproduce pictures from a paper of yours into an academic report**

Atsushi KAWAKAMI <kawakami@pwri.go.jp>

Thu 2/17/2022 3:20 AM

To:Martin Scavone <MScavone@vtti.vt.edu>

Cc:'神谷 恵三' <k.kamiya.ab@c-nexco.co.jp>

Dear Mr. Martin Scavone,

Regarding your requests, you can reproduce our PWRI MWD prototype photos. Then, please state the sources of 2019 PIARC Road congress.

Best regards,

Atsushi KAWAKAMI

**RE: 【機密性 2】 RE: Request to reproduce pictures from a paper of yours into an academic report**

Martin Scavone <MScavone@vtti.vt.edu>

Thu 2/17/2022 9:33 AM

To:Atsushi KAWAKAMI <kawakami@pwri.go.jp>

Cc:'神谷 恵三' <k.kamiya.ab@c-nexco.co.jp>

Dear Mr. Kawakami,

Thank you for such a fast reply and for authorizing me to reproduce the MWD prototypes' images. I will source them as prompted.

Sincerely,

Martin S.

Sent from Mail for Windows

**Figure A-8: LDD. Reproduced from Liao et al., 2019**

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