

Crystalline Silica Dust — The Invisible Killer

How a *Totally Unnecessary* Gravel Mine Would Create
Widely Known Deadly Health Issues
That Would Harm Hundreds of Benzie County Residents

Developed for and Presented to the
Homestead Inland Joint Planning Commission
December 6, 2019

prepared by



Crystalline Silica Dust — The Invisible Killer

Summary

The proposal of an open pit gravel mine in a district zoned Rural Residential creates numerous very serious consequences. This report primarily examines the devastating health issues created by crystalline silica dust, an unavoidable byproduct produced when mining gravel.

Until recently, few understood the dangers created by crystalline silica dust. Unlike normal sand, crystalline silica dust has razor sharp edges and is microscopic in size. When inhaled, it bypasses the body's natural defenses and become *permanently* lodged in the deepest parts of the lungs. It has proven links to diseases that lead to death including silicosis, lung cancer, COPD, renal failure, and kidney disease as well as causing auto-immune diseases like rheumatoid arthritis. These health issues are so grave that OSHA and MIOSHA have recently adopted new safety standards to deal with crystalline silica dust. Both agencies are involved in a massive educational drive to warn workers about the dangers.

Not only is crystalline silica dust deadly, it is difficult to control. Clouds of it can easily be swept up and carried by the wind for tens of miles. Even in what weather experts call 'calm' winds, this deadly dust can travel for miles settling in the yards and on the homes and innocent bystanders in Inland Township, its three neighboring townships, and even further.

All of the related diseases crystalline silica dust is widely known to cause serve as sufficient proof of a 'very serious consequence' health based issue as required under MCL 125.3205 Sec. 205 (5)(e). Denying the requested special use permit for this totally unnecessary gravel mine at parcel 08-006-007-00 is the only logical, fair, and humane course of action the HIJPC can take.

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Direct any questions
about this report to:

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Sand's Tiny Secrets – Size, Material, & Shape

Sand holds some interesting secrets. We think we know what it is, but do we? Technically, 'sand' is any sediment whose particles are 60µm (microns or micrometers) or larger. Granules smaller than 60µm down to 2µm are considered 'silt.' For a point of reference, the hairs on your head are typically 10µm thick.

Sand is often referred to as 'silica.' Most sand deposits are primarily made up of quartz, but other minerals are usually found. Quartz is *crystalline silica*, a silicate mineral made of silicon dioxide (SiO₂), silicon and oxygen. It is the most abundant mineral found in sand.

Figure 1 shows a typical sample of sand, not unlike that which is found all around northern Michigan. It is comprised mostly of crystalline silica (quartz), with some epidote, garnet, potassium feldspar, and a few other minerals.

Figure 1 – 'Sand' (300x Magnification)



Different types of sands are put to work in a wide range of useful applications including: road construction, concrete, filtration, glass, ceramics, and computer chips. They also vary considerably in their marketable value.

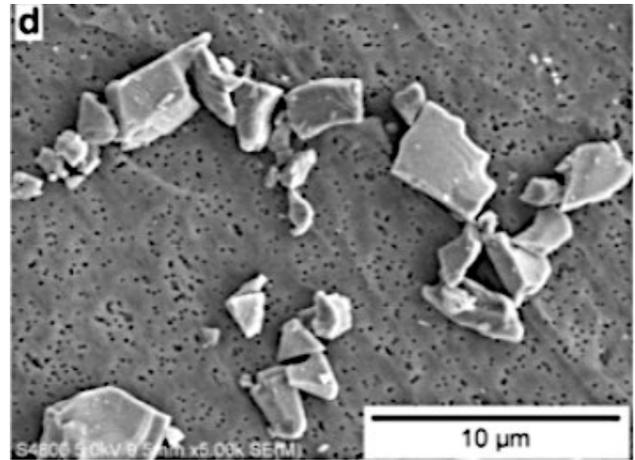
Most sand with which we are familiar is heavily weathered. It has the familiar shape of

stones washed up along the Lake Michigan shoreline. While their sizes may vary a bit, they all have nicely rounded, smooth edges.

Digging into the earth when mining for gravel, the size and shape of these unweathered common sand granules change dramatically.

Figure 2 – Crystalline Silica Dust (5,000x Magnification)

Appendix A shows three even smaller sizes.



Note the 10µm graphic in Figure 2. That's the width of a typical human hair. Anything smaller than 5µm is invisible to the naked eye, unless there are billions of particles — as in crystalline silica dust clouds (see Appx. D p.4).

These jagged microscopic sub-10µm particles are as sharp as a stone-age flint knife — and they can kill you!¹

Crystalline Silica Dust *IS* Deadly

Unlike beach sand which is just annoying when it sticks to your skin and swimsuit, crystalline silica dust *is* a killer. Don't take our word for it, just take OSHA's.²

"[Those inhaling] these very small crystalline silica particles are at increased risk of developing serious silica-related diseases."

¹ Silica...It's Not Just Dust: Silica Dust Causes Silicosis - What rock drillers can do to protect their lungs from silica dust, Center for Disease Control and Prevention, National Institute for Occupational Safety and Health, NIOSH Publications, 97-118, July 1998

² *Respirable Crystalline Silica*, Occupational Safety and Health Administration, United States Department of Labor, osha.gov/dsg/topics/silicacrystalline/

In 2017, OSHA completely revamped their requirements for worker safety when engaged in activities where crystalline silica is present.

Plastered all over OSHA's website and materials is the warning graphic shown here.



So, what exactly are those ‘serious silica-related diseases?’ They include (but are not limited to):

- Silicosis
- Lung Cancer
- COPD (Chronic Obstructive Pulmonary Disease)
- Kidney Disease

Silicosis is an *incurable* lung disease that leads to disability and death. We’ve all heard of ‘black lung disease.’ Black lung expert, Dr. Robert Cohen, has recently warned that

“[Crystalline] Silica could be even more dangerous to workers than coal dust.

[Crystalline] Silica is actually a lung carcinogen. And it causes renal disease, it causes other auto-immune diseases like rheumatoid arthritis and other things, so silica exposure is a huge problem.³

So serious is this issue that even the Michigan Aggregate Association (the lobbying organization behind the totally discredited MDOT *Michigan Aggregates Market Study Ph I & Ph II Reports*) is actively encouraging its member supporters to attend OSHA approved silica training!⁴ Why does the MAA promote this you ask?

*“To increase workers’ **awareness of the serious health hazards of silica dust** and provide the knowledge necessary for employee protections.”*

Why is Crystalline Silica Dust So Deadly?

Mother Nature provided our respiratory tracts with a host of protective mechanisms to ‘filter out’ most of the junk that *naturally* occurs in our air. Since most of what nature throws at us is over 10µm in size, we do a pretty good job of keeping the bad stuff out of our bodies.

However, breathing crystalline silica dust is the equivalent of inhaling millions of microscopic razor blades. As shown in Appendix A, these dust particles can be as small as .01µm.

These invisible particles pass all body defense mechanisms and become embedded in the deepest reaches of the lungs. This is where the greatest danger lies as they reach the alveoli, the finest branches of the lungs where the oxygen/carbon dioxide exchange takes place.⁵

When inhaled, particulate matter larger than 5µm usually gets trapped and expelled before it reaches the lung’s gas-exchange zone.

Particles smaller than 5µm are considered to be ‘respirable,’ meaning they can reach the deepest parts of the human lungs.

³ *Silica safety urged in QLD*, OHS Career, March 21, 2017, ohscareer.com.au

⁴ *Protecting and Promoting Your Interests*, Michigan Aggregate Association, November 16, 2019 See Appendix B

⁵ A. Voss and S. Alfano, *The Body’s Defenses Against Breathing Dirty Air*, ProRemodler, June 23, 2016

Mother Nature never planned on us being exposed to crystalline silica dust, certainly not in the quantities produced by our many industrial activities. Silicosis can develop very quickly and (short of an entire lung transplant) is completely untreatable.

Think You're Safe? — Wrong!

OSHA is making a tremendous push to raise worker awareness of the real hazards created by crystalline silica dust. Wearing adequate dust protection, respirators, and controlling the dust in the first place will save countless lives. How about those who don't work around this stuff?

Non-occupational exposure to crystalline silica dust is even greater cause for concern. As this 'killer dust' spreads miles past its place of origin it not only lingers in the air but settles everywhere — including *inside* homes.

We spend the majority of our time at home. Depending on our job and lifestyle that can be 70%-100% of our time. Unlike a protected work environment, exposure at home is unprotected and constant. Home settings also includes children and the elderly who are more vulnerable than able bodied workers. Not only do children breath more deeply than adults, their smaller body mass means their comparable exposure risk is much higher.⁶

Exposure limits for crystalline silica differ considerably between work and non-occupational exposure. OSHA's permissible exposure limit is 50 micrograms per cubic meter during an 8-hour workday.⁷ Michigan follows these guidelines which includes an

'action level' set at 25 micrograms per cubic meter. Michigan also requires employers to safeguard employees from exposure, provide them with respiratory protection, maintain medical surveillance, engage in hazard communication, and keep good records.⁸

For those who spend all their time at home, equivalent exposure limits would fall below 12 micrograms per cubic meter for exposure and 6 micrograms per cubic meter for action.

I'm Nowhere Near Silica Dust — Really?

Turns out, size really does matter. For crystalline silica dust, the smaller it is the more threatening it becomes. Not only is this invisible dust respirable, it easily becomes airborne, stays airborne for extended periods of time, and travels incredible distances.⁹

Particles typically need to be under 200µm in size to become airborne. Those smaller than 10µm are invisible and smaller than 5µm penetrate our immune system. As shown in Figure 3, dangerous crystalline silica dust easily travels for miles. It not only affects people at the source but those in surrounding neighborhoods. In some measured cases as far away as 50 miles.¹⁰

Figure 3 – Distance Traveled by Particulate Size

Wind Speed (mph)	Miles Traveled	
	10µm	5µm
3.1	0.55	2.2
6.2	1.1	4.5
12.4	2.3	9
24.8	4.6	18
37.3	6.9	27
49.7	9.2	36.1

⁶ J. Warren, *Silica Monitoring*, Public Lab, publiclab.org, February 22, 2018

⁷ C.A. Epstein, *Everything You Need to Know About OSHA's Respirable Crystalline Silica Final Rule*, February 2, 2018, oshaonline.com

⁸ *Crystalline Silica Exposure*, MIOSHA Fact Sheet, CSH Fact Sheet - #109, Revised October 12, 2017

⁹ *Silica Dust Particle Size Causes Problems*, BossTek, 2019, bosstek.com/silica-dust-compliance/silica-particle-size-behavior

¹⁰ *How Far Can Respirable dust Actually Travel?*, Insider News, NeSilex, September 24, 2019

How Far Will Silica Dust Spread Here?

The only available historic ‘local’ wind measurements are those taken at the Frankfort and Traverse City airports. Appendix C contains the diagrams of the wind history at both airports for the months of May – October (the busiest times for gravel production).

Roughly one-third of the time the wind is calm (less than 5.8mph). Calm doesn’t mean ‘dead calm.’ Shown as red in Figure 5, at 5.8mph respirable silica would still travel 4.2 miles from the proposed 150-acre gravel mine.

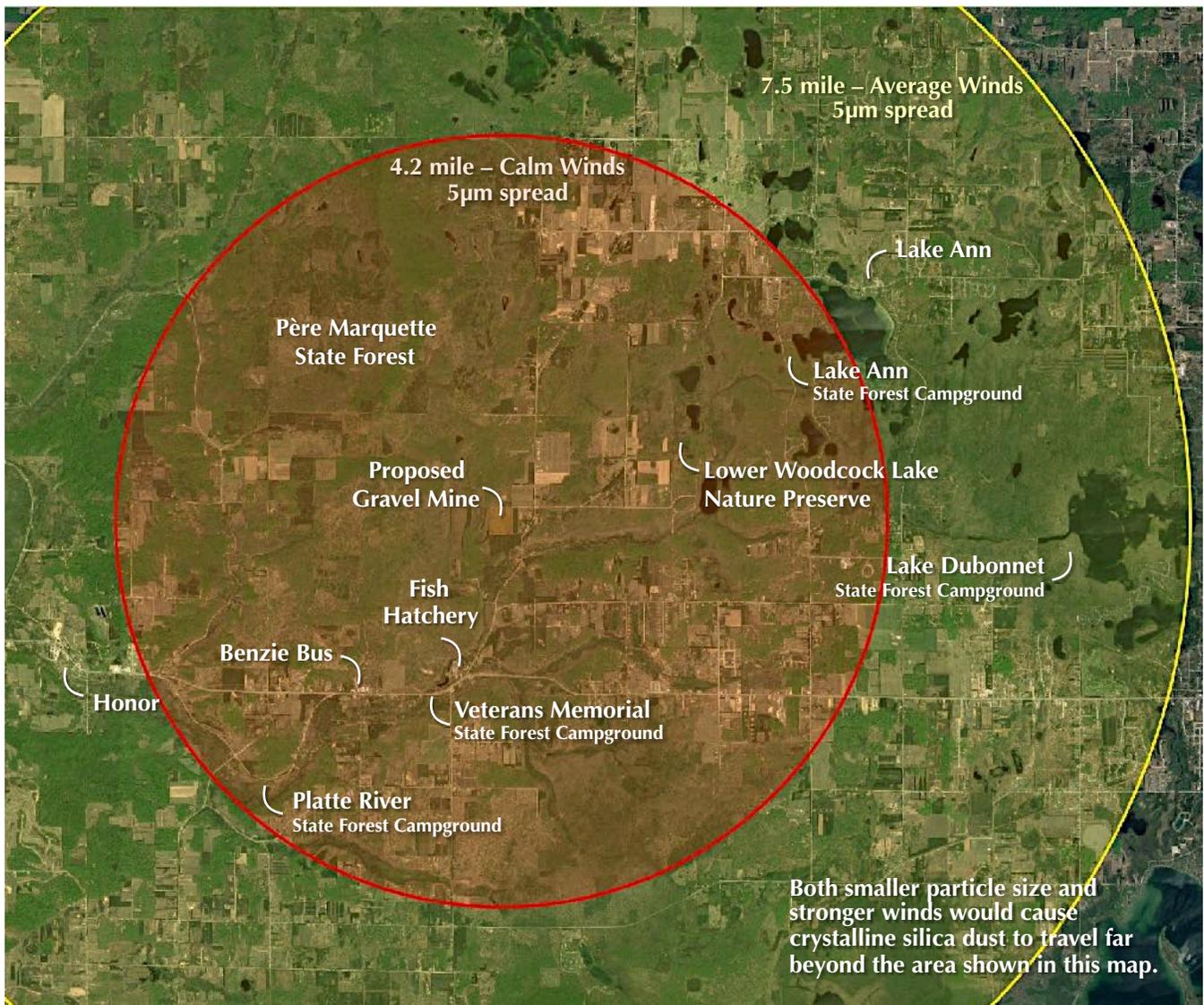
This area’s Average windspeed over the past three years for May – October, the average Maximum sustained winds, and average Gusts are shown in Figure 4. The miles that silica dust can be spread relates to particulate size.¹¹

Figure 4 – Crystalline Silica Dust Wind Distribution

	Wind Speed (mph)	Miles Traveled 10µm	Miles Traveled 5µm
Calm	<5.8	<1.0	<4.2
Average	10.3	1.9	7.5
Maximum	23.9	4.4	17.4
Gusts	39.8	7.4	28.9

Note: Silica Dust smaller than 5µm travels even further!

Figure 5 – Likely Spread of Crystalline Silica Dust



¹¹ While wind data was pulled from the Weather Underground, all data originates from the National Centers for Environmental Information, National Oceanic and Atmospheric Administration.

It's easy to understand how these microscopic razor blades carry so far in gentle winds. Strong gusts can carry crystalline silica dust all the way to Traverse City or Frankfort. As duly noted in the Homestead Inland Townships Master Plan, this truly is an issue of "Greater Than Local Concern."

Where's the Problem? – You Can't Be Serious!

Mr. Leman has done little to instill confidence that he understands the consequences of his desire to have a hobby gravel mine. In a September 12, 2019, TV 7&4 News interview, Mr. Leman states

"There's no production things we processes that we would do here which would pollute the ground in any way. That sand and gravel is already in the ground."

Seriously? It is obvious he doesn't understand the environmental impact of gravel mining or the dangerous release of crystalline silica dust which mining causes.

Mr. Leman is also quoted in that interview and in papers saying he's only going to work on 4-acres at a time. Yet all of the plans submitted to and described at HIJPC meetings clearly show sections of 6+ acres. If he is so inattentive to these and other details, how can he ever be trusted to understand or look after what's necessary to run a gravel mine safely?

Crystalline silica dust is a serious health issue. Given Mr. Leman's lack of responsiveness to providing a complete and timely application, let alone his inconsistency within those plans, many believe he's not taking things seriously. If that's the case and if his special use permit is granted, many wonder if he would ever follow safety precautions or take any laws seriously.

Given there appears to be no statutory value to the gravel as defined under MCL 125.3205 Sec. 205 (3) and there are considerable health risks, in the opinion of neighboring residents the risks completely outweigh the non-benefit.

Having focused on the harm silica dust does to humans, the same needs to be noted about the local wildlife. Further, local organic farming would also be disrupted as the strict protocols of being organic are unavoidably, unfairly, and unjustifiably violated. Even on a 'calm' day, over 55-square miles are put at risk. Kick the wind up to 'average' speed and the number jumps to over 176-square miles.

It is abundantly obvious that allowing the operation of an open pit gravel mine would create uncontrolled crystalline silica dust.

Beyond the flood of studies readily discoverable online and the recently adopted push by OSHA to protect workers, this report clearly outlines the very serious consequence that would result from granting the requested special use permit. It fulfills the requirement of defining a 'very serious consequence' under MCL 125.3205 Sec. 205 (5)(e)

"The impact on other identifiable health, safety, and welfare interests in the local unit of government."

But It's Just a Small Operation – Yeh, Right!

Getting one's foot in the door appears to be a standard ploy. There are dozens (if not hundreds) of stories about little mining operations that were never supposed to grow much bigger — but did — and did so quickly. Here's just one of those stories.

Downstate in Grass Lake Township, just 25 miles west of Ann Arbor, the Bohne Road Gravel Mine started as a little operation.

The local farmer was granted a special use permit to mine sand on his land for his own use on his farm. No big deal, right?

Then the farmer sells his farm to a company that expands the mine's operation into gravel extraction — hey, the special use permit said sand and gravel, not 'just sand.' The mine grew quickly. So did the problems.

In addition to the quality of life disruption and property devaluation experienced by the gravel mine's neighbors, crystalline silica dust became problematic. As some residents shared with their planning commission¹²

"...the dust issue is a HUGE factor here."

"The gravel pit is a serious health risk."

"...my windows haven't been open since the mine was started."

"There is dust all over the plants and trees in the yard as well as the house and car on a daily basis."

"The dust is a nightmare!! It's constantly in the air..."

"We are concerned for the health of our family, my daughter and I have sever asthma ... we will have to continue to wear our masks to try and keep the contaminants out of our lungs. Why do we have to suffer?"

"There is overwhelming evidence regarding longterm silica dust exposure and respiratory disease. Residents near Bohne Road gravel pit testified they now suffer form respiratory diseases such as asthma and COPD."

"Why should the residents be subjected to all these issues from this gravel pit?"

The last comment raises a great question.

Figure 6 – Crystalline Silica Dust *Inside* a Home
(near the Bohne Road Gravel Mine)



As the years passed, the gravel mine was sold to its new owner who now wants to expand operations even further. What was once a 'little private sand mine' has turned a community upside down with a full-blown gravel mining as shown in the pictures of Figure 7 on the next page.

Don't Tell Us It Can't Happen Here!

It could. Far too easily it could. Need or benefit of this gravel mine does not exist. The damage to the community would be devastating and permanent. The HIJPC has evidence of very serious consequences which it can utilize to equitably and justifiably deny the requested special use permit. Crystalline silica dust is perhaps the most compelling of all very serious consequences.

¹² Excerpts from a private Memorandum from Dr. Sandra McCoy, December 3, 2019, full memorandum in Appendix D

Crystalline Silica Dust — The Invisible Killer

Figure 7 – Bohne Road Gravel Mine, Grass Lake Township, Michigan



Conclusion

To the communities' knowledge, Mr. Leman has failed to provide credible evidence that there is a need for more gravel production in Benzie County. With over a dozen-and-a-half gravel mines within 2 – 12 miles with at least two being major operators, supply far exceeds demand.

To underscore Mr. Leman's apparent lack of market awareness, in his September 12, 2019, TV 7&4 News interview, he states

"People want to move to our area and the demand for construction materials is certainly there. Sand and gravel from our community means you don't waste fuel and truck this stuff in from a long ways away. They can get it right down the street."

First, as noted in the newly formed Inland Township Planning Commission's November 27, 2019 draft Master Plan, as reported by the official U.S. Census, Inland's population has fallen 8.6% since 2010. People certainly may want to move here, but the official numbers suggest they aren't doing so. "Demand for construction materials is certainly [here]" — and it is being more than sufficiently met by existing operators. More gravel mines in our area *are not* needed.

Second, there isn't much building going on 'right down the street' from this 150-acre Rural Residential parcel. Even with the horrible mileage a gravel truck gets, given the close proximity of existing gravel mines, any theoretical savings on 'wasted fuel' is meaningless.

Mr. Leman's hasn't and likely can't justify that mining at this Rural Residential

property would produce revenue of a sufficient enough level that he could reasonably expect to operate at a profit, a requirement under Michigan's Zoning Enabling Act, MCL 125.3205 Sec. 205 (3). In the opinion of many, under this act, this lack of profitability precludes finding value in the gravel on that property.

Even if there were valuable minerals to be found there — a hypothetical, not an acknowledgement — the HIJPC must, as required under Michigan's Zoning Enabling Act, balance that value against the very real health issues extracting it would create.

Clearly stated in MCL 125.3205 Sec. 205 (5)(e) and supported by OSHA, MIOSHA, scores of other reputable organizations, and health experts worldwide, the dangers of crystalline silica dust definitely creates a 'very serious consequence' that would

"impact on other identifiable health, safety, and welfare interests in the local unit of government."

The residents of Inland Township and Benzie County would be unduly and unnecessarily punished if the special use permit for parcel 08-006-007-00 were approved.

For the negative financial impacts it would impose on local property values, granting a special use permit would be unfair. For the unavoidable health problems it would unleash, such a decision would be downright cruel.

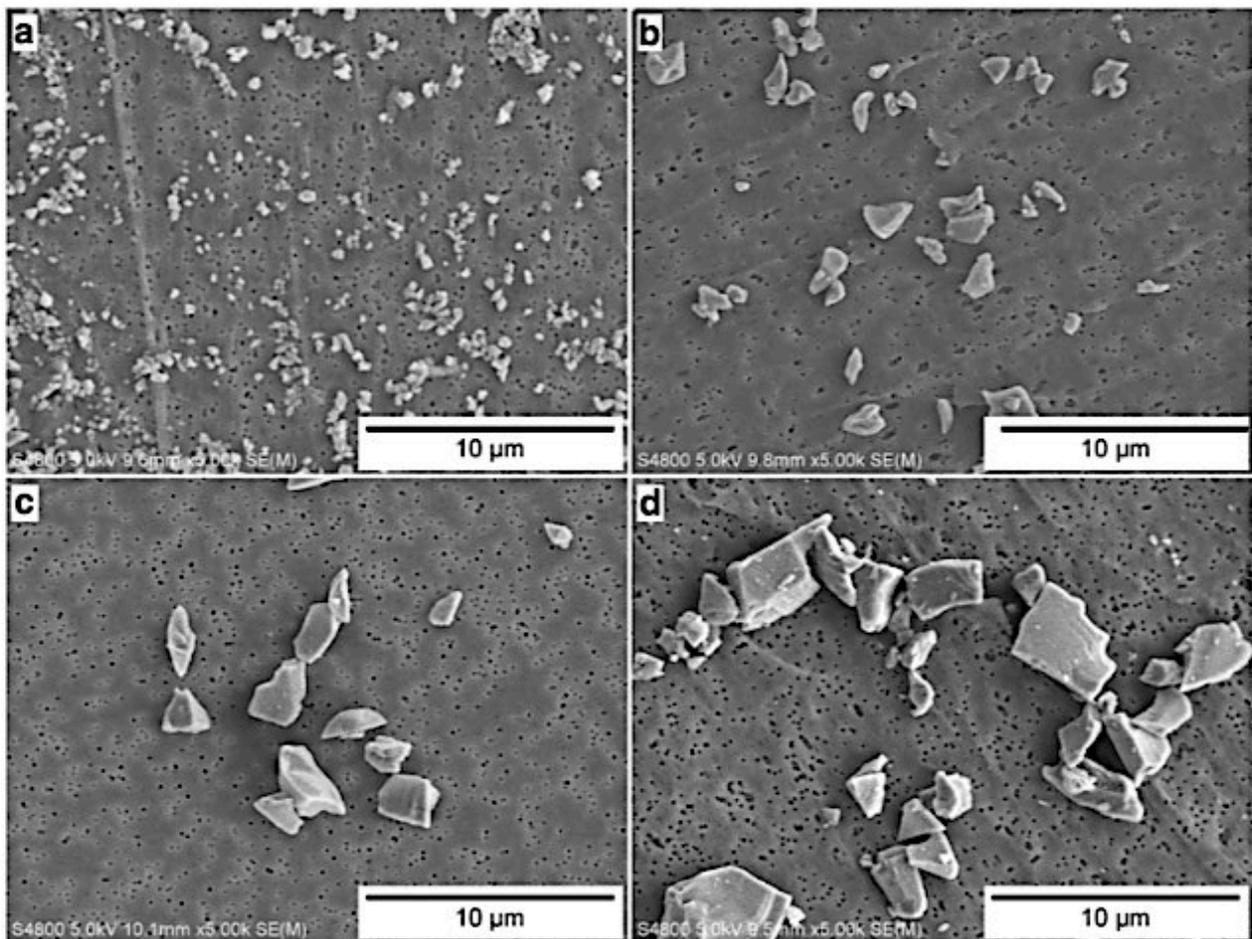


5,000x Images of Crystalline Silica Dust

These electron microscope images of the crystalline silica dust sort their sizes from 'ultra-fine' (as small as $0.01\mu\text{m}$) to 'course' (up to $7\mu\text{m}$). For reference, $10\mu\text{m}$ is the typical width of a human hair, represented here as the graphic insert of each image.

At sizes of $5\mu\text{m}$ and smaller, these microscopic razor blades are not only invisible, they are respirable. That is, when inhaled, they bypass all immune system defenses and can travel all the way to the deepest parts of the human lungs. There they *permanently* imbed themselves and begin creating their havoc on one's health.

As reported here and recognized by the medical community around the world, crystalline silica dust is deadly. It causes silicosis (an *incurable lung disease* that leads to disability and death), lung cancer, COPD (Chronic Obstructive Pulmonary Disease), kidney disease, renal disease, and auto-immune diseases such as rheumatoid arthritis.



Comparison of SEM images of the four sizes of crystalline silica particles used for this study, (a) Ultrafine (UF), (b) Submicron (S), (c) Respirable (R), and (d) Coarse (C).

Images are all at the same magnification (5,000x)

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OSHA Approved Silica Training



MAA and MITA has partnered with Wayne State University to offer Respirable Crystalline Silica training.

This program was developed through an OSHA Susan Harwood Training Grant and is designed for the construction industry (construction professionals including but not limited to workers, site superintendents, project managers, safety managers) to increase workers' awareness of the serious health hazards of silica dust and provide the knowledge necessary for employee protections.

The training covers the new OSHA Standard on Respirable Crystalline Silica (29 CFR 1926.1153) and it aims to increase workers' awareness on the serious health hazards associated with silica exposure and provide the knowledge necessary to perform work safely when there is silica exposure and ways to limit silica exposure.

Trainees who complete all the training steps will be eligible to receive a certification.

The cost for the training is provided by funds from the grant but space is limited (max 30), so if you are interested please contact the MAA office to register. Space will be filled on first come basis.

Training dates and locations are as follows:

All training times will be from 10:00 am to 12:00 pm.

December 17, 2019

Michigan CAT

Grand Rapids, MI

December 18, 2019

ALS Construction Equipment - Lansing

3600 N Grand River Ave

Lansing, MI 48906

For more information about these sessions, please click here.

(https://gallery.mailchimp.com/d250bd5a823dc6dd5e1625052/files/f6fc3d95-753e-44ad-9b3a-b1ae46de08bf/SH_Silica_Training_Marketing_Flyer.pdf)

If you have any questions, please contact the MAA office at 517-381-1732



**OSHA SUSAN HARWOOD GRANT
RESPIRABLE CRYSTALLINE SILICA SAFETY TRAINING**

In-Class Silica Safety Training for Construction Industry

Training contact hours:
1.5 to 2 Hours

Effective October 23, 2017, OSHA has been fully enforcing all appropriate provisions of the Silica in Construction standard.



Our OSHA APPROVED TRAINING MATERIALS were developed under an OSHA Susan Harwood training grant and designed for the construction industry to increase workers' awareness of the serious health hazards of silica dust and provide the knowledge necessary for employee protections.

This training is for all the construction professionals including but not limited to workers, site superintendents, project managers, safety managers and employers.

If you are interested in an in-class training for your company or organization, please contact one of the training coordinators below to schedule a session.

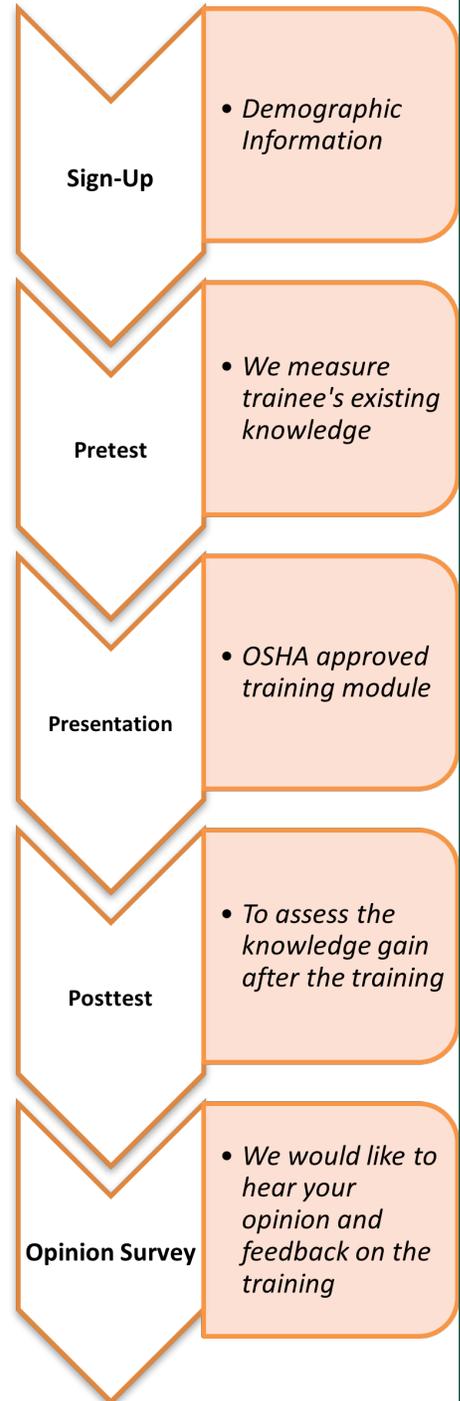
Training Session Scheduling or for More Information

Please Contact

Mumtaz A. Usmen, PhD, PE
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Phone: (313) 577-3608

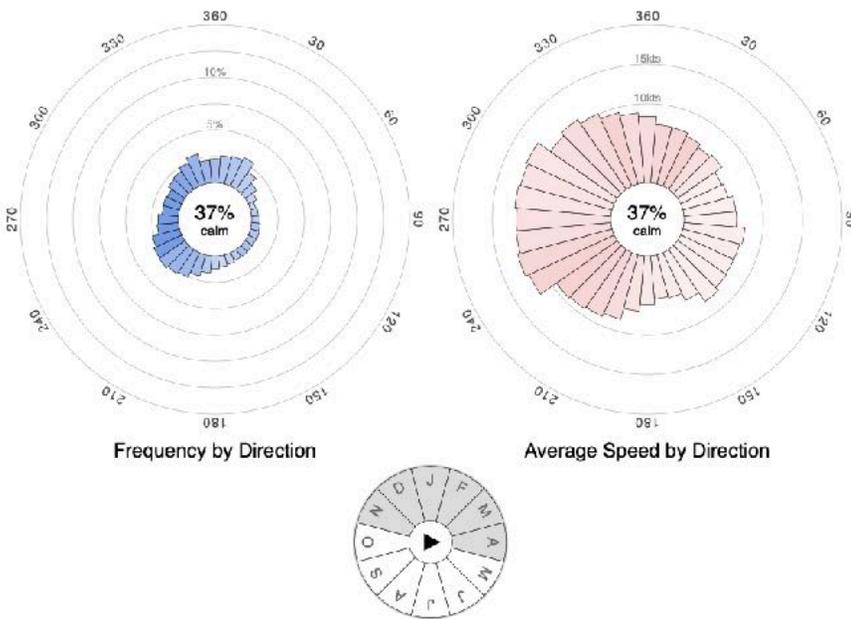
Emrah Kazan, PhD
e-mail: ekazan@wayne.edu

TRAINEES WHO PARTICIPATE in and complete the whole training will receive a certificate.



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KTVC: Cherry Capital Airport



Frequency by Direction

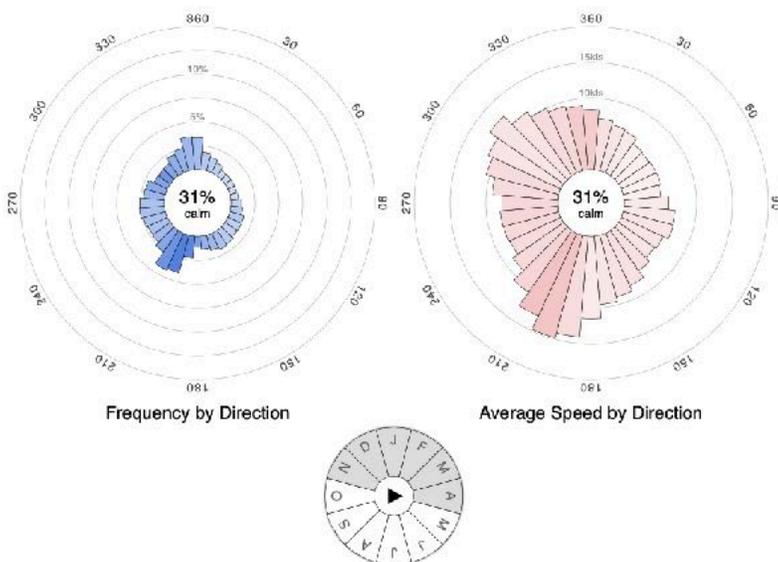
Average Speed by Direction

44.7439, -85.585 [WeatherSpark](#) [Wunderground](#) [VFRMap](#) [RunwayFinder](#) [NavMonster](#)

A diagram of the prevailing winds at **KTVC: Cherry Capital Airport**. The blue diagram at left is a wind rose: the bar length shows the frequency of winds from each direction. In the red diagram at right the bar length shows the average speed of winds when they come from that direction. For more information, see [about this site](#).

[Wind History](#). Copyright © 2011 Daedalus Bits, LLC. All rights reserved.

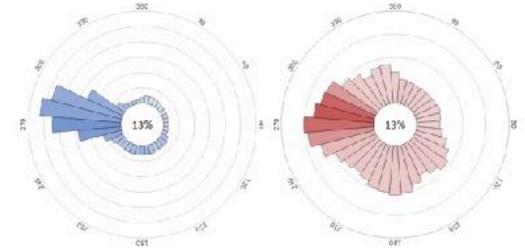
KFKS: Frankfort, Frankfort Dow Memorial Field Airport



Frequency by Direction

Average Speed by Direction

STATION VIEW



The station view shows the prevailing winds for a single weather station. Above is an example image for **KFSFO**, San Francisco airport.

The blue diagram at left is a classic **Wind Rose**. The length of each bar is proportional to the frequency the wind comes from each direction and the colour is proportional to the average speed. At **KFSFO** the wind is pretty much always from the west. The most common direction is 280°, 13% of the time with an average speed of 13kts.

The red diagram at right shows the same data as the wind rose but emphasizes wind speed. Bar length is proportional to average speed and colour is proportional to frequency. At **KFSFO** northeast winds are rare, and when they come they tend to be light. The strongest winds come from 270°, 15kts 11% of the time.

You may hover the mouse over a bar to see exact textual data. In both diagrams the percentage in the middle indicates how often the winds are less than 5 knots (13% at **KFSFO**). There are links on the station page for further information: [WeatherSpark](#) is a particularly nice complementary site showing historical weather.

MONTH FILTER

The month filter allows you to display prevailing winds for specific months. Click the calendar wedges to toggle each specific month off and on. Click the play button in the middle to animate your selection through the year.



DATA

The source data for these graphs is the [NOAA archive](#). METARs from 2006 to 2010 were parsed and crunched to calculate average winds for each weather station. Reporting variance and data processing errors mean these diagrams are not true statistical samples.

BROWSER COMPATIBILITY

This site makes extensive use of SVG for graphics. It should work fine in modern versions of Firefox, Safari, Mobile Safari, Chrome, and Microsoft Internet Explorer 9. It will not work in IE 6, 7, or 8 and never will.

FEEDBACK

This site is a labour of love: feedback and suggestions are most welcome. Please mail comments@windhistory.com with any thoughts you have. Some planned enhancements include showing winds for specific months and showing more detailed histograms.

SOURCE: Weather Underground wunderground.com reported data from NOAA (National Centers for Environmental Information) National Oceanic and Atmospheric Administration

MEMORANDUM

TO: Jim Brouwer, Friends of Platte River Watershed

FROM: Sandra McCoy, Ph.D.

DATE: December 3, 2019

RE: Bohne Rd Gravel Mine, Grass Lake, Michigan

Jim,

I moved to Grass Lake Township, Michigan 1-1/2 years ago. Grass Lake is a small town, about 25 minutes West of Ann Arbor. It has a delightful "rural" character and that is what draws many people to settle here. Grass Lake Township has been embroiled in conflicts for many years concerning the incursion of gravel mining into residential areas in our community.

I am pleased to provide some excerpts from letters written by the residents of Grass Lake Township to their Township government over the past several years concerning the Bohne Rd gravel mine which has operated since 2003. These letters were obtained through a FOIA request. Also included are excerpts from Grass Lake Planning Commission meeting minutes. Many of the comments illustrate the negative effects of dust and health concerns related to mining operations in close proximity to residential areas.

"We purchased 5-1/2 acres of land... in 1999 to build our final dream home. Since the start of the sand extraction operation... in August, 2003, our lives have been totally disrupted and our land value has definitely gone down."
"Needless to say the dust issue is a HUGE factor here. The day they were doing this our whole house and deck were covered with dust and still is. I can't even open my windows. These big earth movers were coming by our property every 10 minutes and the noise and dust was unbearable."

"Gravel pits in residential areas undoubtedly cause health and safety concerns and much disturbance for surrounding residents... The gravel pit on Bohne Road as currently operating provides no benefit to Grass Lake Township... We need to consider the more than 200 people that live within a 2 mile radius of the gravel pit with many living within 50-100 feet of pit operations. These people have stated they now must close their windows due to the dust created by gravel pit operations. This certainly is not a desirable condition for them and we can and must protect the value of our homes, the environment and keep our township a safe place to live in."

"The gravel pit is a serious health risk. There are no six foot trees on the berm to eliminate dust. Many people have not been able to walk in the area as a result of the extreme dust and probable air-borne, dangerous silica. There is no monitoring for silica contamination in the air and in the well water." "There has been no MDEQ study done prior to the original SUP to check for environmental health hazards and issues, including aquifer and water table contamination (well water contamination) and negative wildlife issues."

"I would have my windows open to let the fresh air in... Now my windows haven't been open since the mine (then called gravel pit to make it sound smaller and unobtrusive) was started. There is dust all over the plants and trees in the yard as well as the house and car on a daily basis. Inside my house, a layer of dust accumulates within a few days. I don't work in the yard anymore or hang my clothes outside... I've become a prisoner in my home which is supposed to be an enjoyable, safe haven and an investment."

"We live in a log home on Sager road that we built in 2000 and it was supposed to be our dream home." "We couldn't even open our windows at all and still can't. The dust is a nightmare!! It's constantly in the air... and it's destroyed the finish on our home & decks and we have to clean it multiple times in a year now versus every 4-5 years." The biggest and closest to me is being diagnosed with a blood cancer called Multiple Myeloma. I went thru chemo for 9 months twice a week and had a stem cell collection. It's been the hardest 2 years of my life!!! I asked my dr. at the UofM cancer center what is the cause of Multiple Myeloma?? He said there is a connection from diesel fumes in the air. There are diesel trucks running all day long right behind my house since they opened this sand mine around 2001 or 2002. So this has been going on for around 17 years now. "

"We are concerned for the health of our family, my daughter and I have severe asthma and are worried over the silica dust among other gravel pit issues that has caused our asthma to be in a constant state of flux. We are concerned with the location of the gravel pit being so close to our property and our well that we use for water. We don't want our well to be contaminated... We unfortunately are not in a position to move, so we will continue to keep our doors and windows shut, continue to have our house vents, ac and heat checked for contaminants that the gravel pit puts upon us, we are not able to enjoy sitting outside on our deck, swimming in our pool and we will have to continue to wear our masks to try and keep the contaminants out of our lungs. Why do we have to suffer?"

"There is overwhelming evidence regarding longterm silica dust exposure and respiratory disease. Residents near Bohne Road gravel pit testified they now suffer from respiratory diseases such as asthma and COPD."

“The site alone is appalling with the noise, dust, contamination of the stream near the gravel pit, the pond, wildlife absent and natural resources. Why is this gravel pit still in operation, from failing to comply with the agreement from 21 March 2018? “Why should the residents be subjected to all these issues from this gravel pit”.

“8/15/19 1.33pm to 1.40pm, while my husband and I were driving along Bohne Rd, Grass Lake, right near the Bohne Rd Gravel Pit. The dust was so bad we had to pull over on to the side of the road because we couldn’t see in front of us.” “No only is this mine dangerous to any vehicle who happens to travel along Bohne Rd, the health issues caused by the dust and diesel fumes are catastrophic.”

I think the issue is best summed up by one Bohne Road resident in a letter to the Township, urging them not to renew the mine permit:

“The residents need to be able to open their windows, sit outside, children need to play outside, they need sleep, they need peace and quiet, most importantly, they need to breathe, be healthy, and they need to smile and dream again.”

A handwritten signature in black ink, appearing to read "A. M. Cloy". The signature is written in a cursive, flowing style with a large initial "A" and "M".

