



THE FIRE LINE

Fond du Lac Fire/Rescue Monthly Newsletter

June, 2019 Edition

FIRE LINE - DO NOT CROSS

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FROM THE BALCONY

A message from Chief Peter O'Leary



Graduations Are In the Air

In a previous column I have written about this time of year when we celebrate graduations. Parents, grandparents, family and friends attend graduation ceremonies which honor achievements worthy of celebrations!

We are fortunate to have two recent graduates in our fire rescue family. Assistant Chief Todd Janquart earned his Master of Science in Leadership from Grand Canyon University and Captain Garth Schumacher earned his Executive Fire Officer designation after successfully completing his studies at the National Fire Academy (NFA). I have witnessed both men put forth a great amount of effort to achieve these personal and professional milestones and I couldn't be any happier for them for their accomplishments!



Advanced academic degrees in our profession are generally not the norm. Many of us coming up the ranks often times put academics to the side after landing the job and establishing themselves in the workforce. I know, I was one of those people! Undergraduate and graduate studies have never been more accommodating than they are today. Online courses make going back to school much easier for students who live a busy lifestyle. Unless you live nearby a college you can virtually attend the college of your choice without ever stepping foot on their campus. Online learning is also a way for the student to find the academic program which best suits his/her area of study.

However, we should never seek out an academic degree just to get a piece of paper to hang on the wall. The challenge is to go to school with the mindset that the degree validates the effort you gave, the things you've learned and that what you hope to apply in your professional life. I encourage you all to take advantage of the educational opportunities that exist and take full advantage of college, graduate and NFA courses. I am always available to help any member who wishes to map out future educational possibilities. Our list of undergraduate and graduate degree members continues to grow as does our list of Executive Fire Officers. I encourage you all to get back to school and continue to learn so you are ready for your next promotion!

Please help me congratulate Todd and Garth on their accomplishments! Well done!

*Until next month,
Stay safe and be well.*

INSIDE THIS ISSUE:

From the Balcony	1
Avoid Spoliation during Overhaul	2-3
Operations by the Numbers	4
Patient Assessment	5-6
Tactical 360	7-8
News from the Station	9
Lithium Battery Prevention	10-11
New Construction Status	13
Campfire Safety	14
Peer Fitness Tips	15-17

UPCOMING EVENTS

**DockSpiders Home Opener
June 1**

**Walleye Weekend
June 7 - 9**



**Happy Father's Day!
Sunday, June 16th**

FOND DU LAC FIRE RESCUE OPERATIONS

By: Assistant Chief Erick Gerritson



How to Avoid Spoliation during Overhaul

There has been quite a lot of debate lately about the use of overhaul versus preservation of evidence at fire scenes. We need to hold the fine line between returning to a scene for a rekindle, which is a “cardinal sin” in the fire service, and the destruction of evidence which may carry long lasting effects on the homeowner and their insurance carrier. The article below written by Karen Facey from www.firehouse.com, discusses how to walk that fine line with regard to fire scene spoliation.

What is spoliation?

Fire investigators need a scene left intact in order to conduct a quality origin and cause investigation. Spoliation is the destruction of a scene, or the loss of critical evidence. Investigators read burn patterns by looking at the effects of fire on gypsum board and plaster walls. They de-layer rafters, joists, studs, insulation, gypsum, plaster and lathe, ceiling tiles and whatever else has dropped down to uncover the furnishings in the room. They will carefully locate and trace every piece of household wiring, every circuit, and every appliance or cord attached to that wiring looking for the tiniest arc. They will meticulously keep up hours of back-breaking digging, often on hands and knees, going piece by piece like a carefully orchestrated archaeological excavation to recreate where each chair, desk, TV, power strip, rug, and item of clothing was located.

The origin and cause determinations are considered expert decisions. Investigators must qualify as expert witnesses to testify in court both on criminal and civil cases. It is a huge responsibility, challenged further by the fact fire investigations inherently involve negative corpus; the absence of the body. This means they quite often lack key evidence due to fire's destructive properties, which can create a circumstantial case. It is a much stronger legal position to say here is the body, here is the gun, and here is the person who was witnessed firing the gun. It is weaker legally to say here is the burned building, here is the absence of studs and an area of low burning on the floor, so this is the area of greatest damage and therefore the area of origin. Here are items that were in the area of origin and therefore these five items could have been a cause. This specific appliance with internal arcing and a seized motor is the most likely to have caused the fire, but it was also involved in the fire and therefore severely damaged by direct flame impingement and heat.

Thus develops the chicken and egg theory—which damage occurred first? (This is also when all five of those appliances will be secured by investigators as evidence, and later tested in a joint exam by engineers in a laboratory setting.) The scientific method allows for and requires the use of deductive reasoning, which expects scientific inference by the fire investigator to establish the chain of events contributing to a fire's occurrence. However, investigators need evidence to observe, document, and collect to establish the totality of the circumstances and select our final hypothesis that can hold up in court. The first people on scene begin that evidentiary chain and directly and unequivocally influence the outcome of any and all origin and cause investigations.

Overhaul and scene preservation

Enter the balance and dance of overhaul versus scene preservation. Extensive overhaul is only necessary in a few instances: defined as the room being gutted ready for new insulation and wall board, and everything in it spread haphazardly around the yard in the order it came out of various windows—try finding that one cell phone charger that might be the cause in a six-foot diameter by six-foot high frozen debris pile! I have heard firefighters tell the homeowner they gutted the room because everything was a total loss in the room (they're right) and this way the necessary demolition to begin restoring the home was already completed.



While the firefighters' hearts were in the right place, unfortunately they negated the ability for a proper, thorough investigation to be completed. Even worse is when blight ordinances require the yard be cleaned up within hours of a fire, and thus every personal effect and furnishing is now carted away in a roll-off container before anyone has had a chance to look at the contents and read their story; the burn patterns on the side of a chair, a seized motor, internal arcing in a household appliance or along a power cord, extension cords daisy chained together, the list is endless.

FOND DU LAC FIRE RESCUE OPERATIONS

By: Assistant Chief Erick Gerritson



How to Avoid Spoliation during Overhaul, continued...

This means no chance of recovering the homeowner's deductible should XYZ product with a known recall for fire hazards be the cause of the fire. This means no chance to find that first product with a manufacturing defect. The one that would have created the chain of events for a product recall and prevented countless other people from suffering the tragedy of a home fire with its associated risks of injury and loss of life. This means no opportunity to educate both the homeowner and public why numerous extension cords interconnected and running underneath rugs is dangerous. Most of all, this means we cannot give the homeowner the closure and peace of mind they so desperately seek that a definitive origin and cause provides. This means even after they have rebuilt and moved on with their lives, they still have that nagging, omnipresent worry "what if it happens again, we don't know what caused it, did I do something, or am I doing that now in my new home?"

Compromises between firefighters and investigators

So, what are some satisfactory compromises to avoid spoliation? The easiest is to only overhaul and disturb the bare minimum without risking a rekindle. Thermal imaging cameras are a great tool to assist with targeted overhaul efforts. Do you need to throw all of the contents out of the windows, or can you leave most of them in place or simply move them to another side of the room so they can be easily placed back by matching their legs and arms to the protected areas on the floor and walls?



When minimal overhaul is infeasible, photographs are better than nothing. How do you get the photos? One option is to place a point and shoot digital camera in your first-due apparatus, or assign one to the duty officer. Another is to bring your Fire Investigator in with you. Let them gear up before you begin overhaul and take a minute or two to allow them to snap some photos before taking out that wall, or pulling a ceiling. If all else fails, if possible take a few photos with your phone and let your fire investigators know that you have pre-overhaul photos.

When overhauling, please, please, please do not use gas-powered tools or equipment! If there is a need to take samples, or if an accelerant detection canine will be brought in, use of and/or fueling of anything gas-powered can contaminate the scene. Please also do not turn on or off circuits in any electrical panels, remove or disconnect appliances or any mechanical systems and components. If the utility company is unavailable to turn off the power at the pole or transformer or to remove the meter, you may turn off the main breaker or fuse to the main panel. Leaving all other circuits as they are allows investigators to see which circuits tripped along with identifying those that were energized at the time of the fire. This aids us with arc mapping, which is a required process per NFPA 921: Guide to Fire and Explosion Investigations.

Do you need to pull the wall in the room of origin to access the stud bays and framing behind it to check for extension? Can you go to the adjoining room and pull the wall that backs onto the same wall in the room of origin to open the same stud bays, thereby preserving the burn patterns in the room of origin? Yes, you are doing more damage to the home and impacting a potentially uninvolved room. However, if a home has had that much smoke, heat, and water throughout the structure, the reality is every room is likely going to be stripped down to the studs and reinsulated, with new wallboard installed. Floors and walls are often removed due to odors, the potential for mold, and cupping and swelling from water damage. That extra damage really is not additional damage, and it may allow the homeowner to recover their deductible which is the out-of-pocket portion for their homeowner's or renter's insurance.

These simple tips should help both the Incident Commander and the Fire Investigator work side by side to tackle each of their own tactics and agendas at a fire scene.

Until next month...Be Safe!!

OPERATIONS BY THE NUMBERS

APRIL, 2019	THIS MONTH		YEAR-TO-DATE	
PREVENTION	Last Year	This Year	Last Year	This Year
Total Inspections	270	148	1091	1114
Total Defects	208	130	787	583
SUPPRESSION				
Alarms Involving Fire	12	6	49	35
Fire Mutual Aid Given	2	1	6	4
Fire Mutual Aid Received	0	0	1	0
Service/Good Intent Calls	50	43	173	170
False Alarms & False Calls	26	25	94	130
Other Calls	6	8	40	55
Total Fire Alarms & Calls	94	82	356	389
EMS				
Total Ambulance Calls	465	488	1927	2064
Total Fire & Ems Responses	559	570	2283	2453
Fire Property Loss	\$7,605.00	\$52,500.00	\$101,805.00	\$169,138.00
Fire Contents Loss	\$1,190.00	\$22,500.00	\$72,912.00	\$56,601.00
Engine Assisted EMS Calls	185	220	823	879

Congratulations



Congratulations to AC Todd Janquart who recently graduated with a Master of Science in Leadership with an Emphasis in Disaster Preparedness and Executive Fire Leadership from Grand Canyon University, Phoenix, AZ.

Congratulations to Captain Garth Schumacher who earned his Executive Fire Officer designation after successfully completing his studies at the National Fire Academy (NFA).

Awesome Work AC Janquart and Capt. Schumacher!





The Code Summary

*By: Todd Janquart
Assistant Chief of EMS*

Anti-interrogation Patient Assessment

Train EMS providers in patient assessment skills that rely on clear, effective communication

We see many EMS students come through our doors every year to take part in our ride along program. It is a great opportunity for these fresh students to learn from our experienced and knowledgeable paramedics through the mentoring process. It is also an opportunity for us to work with and train EMS providers that could possibly be a future employee. One important component about the mentoring process is the ability for these students to watch experienced providers in their patient assessment and patient interviews specifically. After some time on the job, each EMS provider develops their own style with patient interviews but it is still important to remember that getting good information from our patients requires us to establish a good level of a rapport with them so we are maximizing the amount of information in the shortest amount of time. This article provides some good information to remember regarding the difference between what students are taught in the classroom versus what they need to know for the field.

"When was your last oral intake?" "What were your events leading up to this incident?"

All-too-often, I've seen too many new EMT (and even paramedic) students parrot back these very phrases. And you know what? It's our fault!

For way too long, educators and EMS programs have emphasized just memorizing "the sheet" (referring to the NREMT psychomotor skills evaluations forms for patient assessment). For way too long, students have been taught to interrogate their patients, rather than converse with them.

Now, hopefully this article doesn't resonate with your teaching or practice style ... but if it does, please keep reading on!

Walk into the room, put your hands in the air and repeat after me, "BSI, scene safe."

Education systems have failed us. Heck, I was guilty of it, too, early in my teaching career. Now, however, that practice needs to end. This paradigm needs to change.

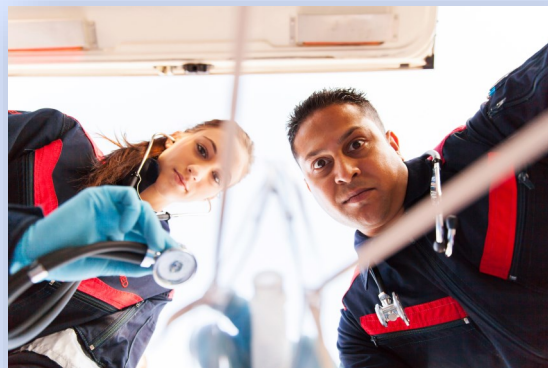
Educators – STOP setting this standard!

Here's why this process of instruction needs to stop. One of the biggest gripes that employers have related to new EMTs and paramedics entering the workforce is that they're not prepared for the real world. Well, I'll bet this lack of conversational training is a significant factor indicating why.

Please, do your students a favor: teach them to converse with their patients. They're counting on you to both teach them the necessary skills to be a competent provider, and to have the confidence to be one once they get their new patch.

STOP interrogating your patients!

Our patients are nervous enough having to call 911, hear the ambulance (and maybe a fire engine) wailing down the road, and have a big billboard parked in front of their house broadcasting that something is going on with their family. The last thing they need is to feel as though they're giving a deposition for why they called, and the last person they want caring for them is someone who sounds like they can't function without following notes on an evaluation sheet.





The Code Summary

*By: Todd Janquart
Assistant Chief of EMS*

Anti-interrogation Patient Assessment, continued...

Here's three take-away tips for educators to share with any new EMS provider, or actively practicing provider, to embrace in order to change their habits and begin to converse with their patients – rather than interrogate them.

1. Pay attention in clinicals

While you may only have one hospital or ambulance clinical built into your EMT program, take advantage of it. Listen to as many lung sounds as you can ... even if the patient's complaint is for a stubbed toe. Take manual – not automatic – blood pressures. And above all, listen to how the nurses, paramedics, mid-level providers and physicians converse with the patient. What may seem like a simple conversation is likely more purpose-driven than you think.

Debrief with your preceptor after each call, after each patient. Ask him or her "why" a certain question was asked. What was the intent or reasoning behind it? What if the patient had answered differently? How would that have changed their questioning?

2. Let the patient explain

Often, the patient can better explain or correlate their symptoms into something that is more tangible to you, like when they say, "it feels like an elephant is sitting on my chest."

There's no check box for that, no drop-down item, no ICD-10 code (or at least I don't think there is).

When referencing the events leading up to the incident, the quality of their pain or their chief complaint in general, allow the patient to explain it in his or her own words. Then, you can formulate it into appropriate medical terminology. When in doubt, remember that plain text is best and is typically universally understood. Epistaxis means nose bleed, but so does simply saying "nose bleed."

3. Don't always think linear

You can always tell which testing candidates have put countless hours into memorizing the flow of their patient assessment evaluation sheets. They can recite the entire form with an exact flow, nearly verbatim, and without missing a single point.

Great, they'll likely pass their psychomotor exam station, but it doesn't necessarily mean that they'll be able to have a conversation with their patient beyond what's typed on the sheet.

Teach your students; don't be afraid to follow the patient's story; what they tell you. Keep the other checklist items in the back of your mind, but feel free to go with the flow a little bit. Ask your patient clarifying questions right now, rather than later on.

Rule-out differential diagnoses as you pass them by in your assessment. By no means do you need to go off-tangent and have the patient explain (in detail) how they had bunion surgery in 2006, but you could certainly get the conversation back on track by interjecting, "has your chronic back pain improved, or worsened, since that event, and have you been prescribed any of your medications as a result of it?"

My point behind all of this is to focus assessment techniques toward methods that sound more natural, more like a conversation. You can still find out when the patient's last oral intake was by simply asking, "When have you last had anything to eat or drink?"

Have your students take their blank patient assessment form and write in the margin next to each line an alternative question or response, something less interrogating and more conversing. This will help them to become better clinicians and more prepared for the field once they get that new patch on their shoulder.

Article from April 26th, 2019 online edition of EMS1.com

Tell me and I forget. Teach me and I remember. Involve me and I learn. Benjamin Franklin

**Well trained people
are the best defense
against fire.**

By: James Knowles III
Assistant Chief Training/Safety

Introducing the Tactical 360

(Part 1 of 3)

In the fire service today, we are seeing a decrease in the overall number of fires, but we are seeing that these fires are rapidly developing due to the higher heat release rates of the contents and construction components. The research performed by Project Kill the Flashover, UL, and NIST all have shown that the fires we experience are reaching the point of flashover in as little as a few minutes in some cases.

These fires are presenting themselves predominantly as ventilation limited with heavy turbulent smoke conditions, higher heat, and limited visibility. With the decrease in total number of fires, the increase of rapid fire development, and the predominant type of fires being ventilation limited let us consider a new perspective on a familiar tactic.

Many of us have been taught to conduct a 360-degree survey upon our initial arrival at an incident. We are trained to look for the differences in building construction, critical fire ground factors, the location of possible victims, and the location of the fire and more.

We have seen the value of this fire ground survey as it enhances our size-up by evaluating the often-unseen critical fire ground factors. So why would we consider a new perspective to an already proven tactic that fire service is already well acquainted with?

As in all things in life, there is always room for improvement and our training skill-sets are no different. We are constantly learning and improving in our personal and professional lives therefore let us consider the value of a Tactical 360.

What is a Tactical 360?

A tactical 360 is a 360-degree survey of a structure on fire from three perspectives: Tactically, Thermally, and Three dimensionally. Whereas a traditional 360 is walk-around survey of the incident scene that allows the Incident Commander to better formulate their Incident Action Plan based on the "big picture" and all of the critical fire ground factors that are specific to that incident.

During this process of a 360, we can often become task fixated and suffer from confusing speed with success. When in fact, by taking a few extra seconds we can greatly impact the success of our efforts.

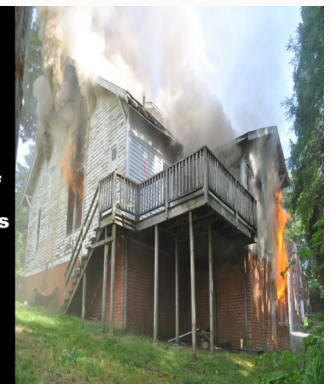
In many cases, firefighters become overwhelmed by the moment and go blindly in the front door without knowing what conditions they may be facing. As Captain William Mora states in his research study (Firefighter Disorientation), firefighters who invest those precious seconds in the time it takes to do a 360 has a life changing return on their investment.

Why is this important?

Tragically we already know that many firefighters have died because of hidden or unseen dangers. Therefore, incidents can often be deceptive from a one-sided view and hide critical factors that can and will kill firefighters. Also the Tactical 360 allows the Incident Commander to possibly locate victims, the location & severity of the fire, identify the flow path, and the opportunity to control any critical fire ground factors that may go unnoticed such as closing open doors to prevent fire growth, controlling utilities as they walk around, and possibly removing an occupant that may be just inside a door or hanging out a window.

Why do a 360?

- "Far too often the first arriving officer feels the overriding need to take immediate action by quickly entering a structure to locate and extinguish the fire. However, an investment of 1 or 2 minutes required to conduct a 360 at the outset has the potential to provide the greater overall safety throughout the remaining course of the fire."
- William R. Mora-Captain San Antonio TX, Fire Department.



**Well trained people
are the best defense
against fire.**

By: James Knowles III
Assistant Chief Training/Safety

Introducing the Tactical 360, continued...

The Tactical 360 doesn't discard nor discount this information, it enhances what we know thereby building upon it. As a firefighter, we already have a foundation and understanding of the concept now we will build upon this skill by viewing the 360 from three perspectives.

Our first perspective is to view the incident tactically. This is what we as the fire service currently do a great job of which is to perform the necessary tasks based upon the conditions presented to us. Many firefighters have learned acronyms to assist them with size-up considerations such as John Norman's (FDNY retired). Our standard tactical considerations are our foundation. We should begin by viewing the incident from this perspective.

We will now we view the incident from a tactical perspective instead of merely an extinguishment perspective. This is known as the Now, Next, Future, Past decision model. What do we have right Now? Where is the fire progressing towards Next? What are our actions to mitigate it at those points in the Future? And what does our Past experiences with this type of incident tell us? Now: What do we have? As we arrive we are viewing the current position of the incidents progression. We are well aware of the rapidly changing fire ground due to higher heat release rates of contents and components.

Next: A proactive Incident Commander is always thinking two steps ahead of the incident. Therefore, we are attempting to forecast where a fire is progressing towards either in a positive or negative way and planning accordingly.

Future: Then we are attempting to view a glimpse into the Future. For example, after arriving on the scene of a one story 1200 square foot single family dwelling, consisting of light weight construction, with fire visible from the A-side windows we can predict that we have roughly a few minutes or less to identify, defend, or kill the extreme fire behavior based on our knowledge of light weight construction and fire dynamics.

Past: Our past learnings tell us that buildings of this type fail or collapse quickly under heavy fire conditions, so our Incident Action Plan will address the conditions accordingly.

A complete situational size-up must be conducted on every incident. Identifying what specifically is happening and formulating all information obtained into an incident action plan is crucial for the safety of our members and the successful mitigation of the situation.

Next month, additional important fire incident size-up perspectives will be addressed with the utilization of the thermal imaging camera.

Failing to Conduct a Proper 360

- **"Key contributing factors identified in this investigation included that the initial 360-degree size-up was incomplete**
- **Disorientation of victims effecting key survival skills,**
- **Radio communication problems,**
- **Well-involved basement fire before the departments arrival**
- **And potential fire growth from natural gas utilities."**
- **<http://www.cdc.gov/niosh/fire/reports/face200809.html>**



Source: Starnes, A. (2019). *Introducing the Tactical 360*.
Retrieved from: <http://www.blackhelmetbrotherhood.com/introducing-the-tactical-360/>

News from the Station

Welcome Jack Olstinski!



Jack is the newest member of the FDL Fire/Rescue family. Jack is presently deep into the Recruit Academy but took time to share some info about himself. My name is Jack Olstinski, I am originally from Saint Francis, WI. I was introduced to the fire service through a cadet class in high school where I fell in love with the job. Right out of high school I went to MATC Milwaukee and received an Associate degree in the Fire Protection Technician program. I went on to work part time for the Town of Lisbon Fire Department where I learned more of the core values and duties of being a Firefighter/EMT. I went on to take Advance EMT and Paramedic at WCTC where I gained more interest in the medical side of the job. I received my paramedic license in August of 2018. After working part time with the Town of Lisbon, I was hired into one of their full time positions where I ran not only Lisbon 911 calls but also Paramedic Intercepts to neighboring communities and Interfacility Transports from our nearby hospital to Froedtert. Before getting into the fire service, I worked a few years as a boat motor mechanic. I was able to take that general mechanical knowledge and bring it to the fire department to head their maintenance program where I learned a lot about the trucks and how they worked while making minor repairs and performing general maintenance. I came to the City of Fond du Lac in search of a place to settle down, start a family, and begin a career at one of the most prestigious fire departments in the state. Some of my hobbies include fishing, hunting, and fixing boat motors, so I believe the Fond du Lac area will be a great fit for me!



The **2019 Brat Fry** was a HUGE success! All of the hard work paid off as FDLFR & IAFF Local 400 raised \$7,223.87 for our local American Red Cross. What an amazing day! Great job by everyone, especially Engineer Mike Spencer who was the organizer of this years event.



A new water service line is being installed at Station 2. This upgrade is necessary to properly supply water for the automatic fire sprinkler system which is being installed this summer.

FIRE PREVENTION

That's what it's all about!

By: Troy Haase
Division Chief of Fire Prevention



Preventing Fire/Explosion Injury from Lithium Battery Powered Devices

Introduction

Small and wearable electronic devices used in workplaces (e.g., body cameras) rely on a power source that stores a high amount of energy in a small space. Lithium cells provide sustained power and often have the capability to recharge. When designed, manufactured, and used properly, lithium batteries are a safe, high energy density power source for devices in the workplace.

While lithium batteries are normally safe, they may cause injury if they have design defects, are made of low quality materials, are assembled incorrectly, are used or recharged improperly, or are damaged. In February 2018, the US Consumer Product Safety Commission's Status Report on High Energy Density Batteries Project reported over 25,000 overheating or fire incidents involving more than 400 types of lithium battery-powered consumer products that occurred over a five-year period.

Many consumer products have practical applications in small and large businesses. Ensuring these products will operate safely in workplaces begins with using batteries, chargers, and associated equipment that are tested in accordance with an appropriate test standard (e.g., UL 2054) and certified by a Nationally Recognized Testing Laboratory (NRTL). Manufacturer's instructions provide procedures for use, charging, and maintenance that is specific to each device and necessary to prevent damage to the lithium batteries. For example, some batteries will overcharge if a charger is used that does not turn off when the battery is fully charged.

Workers who wear or frequently handle lithium-powered devices or batteries are particularly at risk if a lithium battery catches fire or explodes since the device or battery is close to the body. For example, small cameras worn by workers can cause burns or other serious injury if the lithium battery catches fire or explodes while worn. To prevent injury, it is important for employers and workers to understand a lithium-powered devices' basic function, hazards, and safe use.



How Lithium Batteries Work

The term "lithium battery" refers to one or more lithium cells that are electrically connected. Like all batteries, lithium battery cells contain a positive electrode, a negative electrode, a separator, and an electrolyte solution. Atoms or molecules with a net electric charge (i.e., ions) are transferred from a positive electrode to a negative electrode through an electrolyte solution. Lithium cells store and release power by converting chemical potential energy into electrical energy using lithium ions or lithium metal. Electrolyte solutions allow ions to flow freely between the electrodes.

Lithium-ion batteries use lithium in ionic form instead of lithium in solid metallic form. They are also usually rechargeable, often without the need to remove them from the device. Lithium-ion batteries power devices such as mobile telephones, laptop computers, tablets, cameras, and power tools.

Lithium-metal batteries are generally non-rechargeable and have lithium-metal electrodes. Lithium-metal batteries are generally used to power devices such as watches, calculators, temperature data loggers, car key fobs, and defibrillators.

Hazards

Lithium batteries are generally safe and unlikely to malfunction, but only so long as there are no defects and the batteries are not damaged. When lithium batteries fail to operate safely, they may present a fire or explosion hazard. The NRTL testing and certification process, as well as product recalls, help identify defects in design, manufacturing, and material quality. Damage from improper use, storage or charging may also cause lithium batteries to fail.

Damage to lithium batteries can occur immediately or over a period of time, from physical impact, exposure to certain temperatures, and/or improperly charging lithium-ion batteries.

- Physical impacts that can damage lithium batteries include dropping, knocking, crushing, vibrating, and puncturing.
- Damage to all types of lithium batteries can occur when the temperatures are too high (e.g., above 100°F). External heat sources can also accelerate failure in cells with defects or damage from other causes.

FIRE PREVENTION

That's what it's all about!

**By: Troy Haase
Division Chief of Fire Prevention**

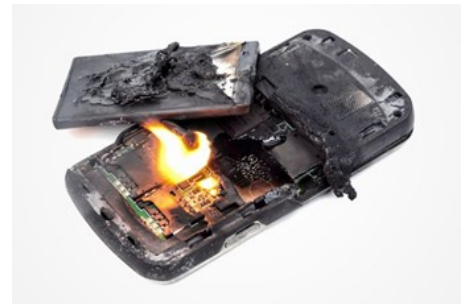


Preventing Fire/Explosion Injury from Lithium Battery Powered Devices, cont.

- Damage to lithium-ion batteries can occur when the batteries themselves or the environment around the batteries is below freezing (32°F) during charging. Charging in temperatures below freezing can lead to permanent metallic lithium buildup (i.e., plating) on the anode, increasing the risk for failure.
- Charging a device or battery without following manufacturer's instructions may cause damage to rechargeable lithium-ion batteries. For example, some manufacturer-authorized chargers will cycle the power to the battery on and off before it is fully charged to avoid overcharging. Since ultra-fast chargers may not cycle power, do not use them unless the manufacturer's instructions include them as an option.

Both defect in, and damage to, lithium batteries can lead to battery failure. Heat released during cell failure can damage nearby cells, releasing more heat in a chain reaction (i.e., thermal runaway). The high energy density in lithium batteries makes them more susceptible to hazardous thermal runaway. Depending on the battery chemistry, size, design, component types, and amount of energy stored in the lithium cell, lithium cell failures can result in chemical reactions and/or combustion reactions, which can also result in heat releases and/or over-pressurization.

- In chemical reactions, by-products from the electrolyte solution and electrodes can increase the pressure in the cell to the point where the cell walls expand and by-products leak out. Chemical by-products usually include carbon monoxide, carbon dioxide, hydrogen, and hydrocarbons. In many cases, the by-products are also combustible and could ignite.
- In combustion reactions, as thermal runaway releases by-products that may ignite to cause smoke, heat, fire, and/or explosion. The by-products from a lithium battery combustion reaction are usually carbon dioxide and water vapor. In some lithium batteries, combustion can separate fluorine from lithium salts in the battery. If mixed with water vapors, fluorine produces hydrofluoric acid, which is particularly hazardous because workers may not feel its effects until hours after skin exposure.



Prevention

Workplace injuries from lithium battery defects or damage are preventable and the following guidelines will assist in incorporating lithium battery safety into an employer's Safety and Health Program:

- Ensure lithium batteries, chargers, and associated equipment are tested in accordance with an appropriate test standard (e.g., UL2054) and certified by a Nationally Recognized Testing Laboratory (NRTL), and are rated for their intended uses.
- Follow manufacturer's instructions for storage, use, charging, and maintenance.
- When replacing batteries and chargers for an electronic device, ensure they are specifically designed and approved for use with the device and they are purchased from the device's manufacturer or a manufacturer authorized reseller.
- Remove lithium-powered devices and batteries from the charger once they are fully charged.
- Store lithium batteries and devices in dry, cool locations and in fire-resistant containers.
- Avoid damaging lithium batteries and devices. Inspect them for signs of damage, such as bulging/cracking, hissing, leaking, rising temperature, and smoking before use, especially if they are wearable. Immediately remove a device or battery from service and place it in an area away from flammable materials if any of these signs are present.
- If batteries are damaged, remove from service and dispose in accordance with local, state, and federal regulations. Contact a local battery recycling center for disposal instructions.
- Follow the employer's policy or manufacturer's guidance on how to extinguish small battery fires, which could include using CO₂, foam, Class D fire extinguishers (for lithium-metal), ABC dry chemical extinguishers, dirt, or sand.

Source: Occupational Safety and Health Administration, January 18, 2019, Web May 6, 2019

Lithium Ion Battery Safety

for Consumers



Lithium ion batteries supply power to many kinds of devices including smart phones, laptops, scooters, e-cigarettes, smoke alarms, toys, and even cars. Take care when using them. In rare cases, they can cause a fire or explosion.

The problem

- These batteries store a large amount of energy in a small amount of space.
- Sometimes batteries are not used the right way; batteries not designed for a specific use can be dangerous.
- Like any product, a small number of these batteries are defective. They can overheat, catch fire, or explode.

Safety Tips

- Purchase and use devices that are listed by a qualified testing laboratory.
- Always follow the manufacturer's instructions.
- Only use the battery that is designed for the device.
- Put batteries in the device the right way.
- Only use the charging cord that came with the device.
- Do not charge a device under your pillow, on your bed or on a couch.
- Keep batteries at room temperature.
- Do not place batteries in direct sunlight or keep them in hot vehicles.
- Store batteries away from anything that can catch fire.

Signs of a Problem

Stop using the battery if you notice these problems: odor, change in color, too much heat, change in shape, leaking, odd noises. If it is safe to do so, move the device away from anything that can catch fire. Call **9-1-1**.

Battery Disposal

- Do not put lithium ion batteries in the trash.
- Recycling is always the best option.
- Take them to a battery recycling location or contact your community for disposal instructions.
- Do not put discarded batteries in piles.

High-Tech Luggage

Some major airlines no longer accept 'smart' luggage with non-removable lithium ion batteries as checked or carry-on luggage. The powerful batteries can potentially overheat and pose a fire hazard during flight.

In some instances, smart bags with removable lithium ion batteries will be allowed on board if the battery can be removed on site and taken on board with the customer. Check with your airline for restrictions.



**NATIONAL FIRE
PROTECTION ASSOCIATION**

The leading information and knowledge resource
on fire, electrical and related hazards

FIRE PREVENTION

That's what it's all about!

**By: Troy Haase
Division Chief of Fire Prevention**



Current Status of New Construction

- CD Smith Corporate Offices on Camelot Drive- Building is complete.
- Fond du Lac County Garage at 1820 S. Hickory Street- Building is under construction.
- JD Byrider on N. Rolling Meadows Drive- Building is under construction.
- Fond du Lac Airport at 260 S. Rolling Meadows Drive- Building is under construction.
- VGM Storage Units at 450-456 West Arndt St.- Buildings are under construction.
- Mercury Marine Plant 17 at 545 W. Pioneer Road- Building is under construction.
- Eilertson Electric at 920 Willow Lawn Road- Building is under construction.
- South Hills at 1175 Fond du Lac Avenue- Building is under construction.
- Fairfield Inn at 935 S. Rolling Meadows Drive- Building is under construction.
- River Hills Mixed Use Development on S. Main Street- Buildings 1, 2, 3, 4, 8 are complete and 5, 6 & 7 are under construction.



Campfire Safety

Sitting under the stars by a crackling fire has its appeal. It's where stories are told, sing-a-longs happen, and meals are cooked over an open flame. Campfires bring family and friends together. But campfire mishaps can cause injuries. With a few safety tips, you can prevent these accidents.

SAFETY AROUND THE FIRE

- Before setting up a campfire, be sure it is permitted. Check with your local fire department.
- If campfires are permitted, they need to be at least 25 feet away from any structure and anything that can burn.
- Clear away dry leaves and sticks, overhanging low branches and shrubs.
- Avoid burning on windy, dry days. It is easier for open burning to spread out of control when it is windy and dry.
- Watch children while the fire is burning. Never let children or pets play or stand too close to the fire.
- Attend to the campfire at all times. A campfire left alone for only a few minutes can grow into a damaging fire.
- Keep a campfire small which is easier to control.
- Never use gasoline or other flammable or combustible liquids.
- Always have a hose, bucket of water, or shovel and dirt or sand nearby to put out the fire. Make sure to put it completely out before leaving the site.
- If your clothes catch fire, stop, drop, and roll. Stop, drop to the ground and cover your face with your hands. Roll over and over or back and forth until the fire is out.
- Treat a burn right away. Cool the burn with cool water for 3 to 5 minutes. Cover with a clean, dry cloth. Get medical help if needed.



ROAST WITH CARE

If roasting marshmallows, help young children. Never shake a roasting marshmallow. It can turn into a flying, flaming ball. A heated metal skewer can cause burns.

FACT

Campfire accidents send thousands of people to emergency rooms with burn injuries every year.



NATIONAL FIRE PROTECTION ASSOCIATION
The leading information and knowledge resource on fire, electrical and related hazards

PEER FITNESS TIPS

By: Peer Fitness Trainer
Jack Prall

Spinal Stability: To Brace or Not to Brace?

"Squeeze your core!"..."Stomach tight!"..."Brace your abs!"

Abdominal bracing cues like these are among those most commonly used in a fitness setting. These are so common, in fact, that little thought is given to their outcome or efficacy.

While core engagement is undoubtedly important, multiple strategies can elicit this outcome. The cues listed above tend to encourage an abdominal bracing strategy in which individuals produce large amounts of muscular force to stabilize the spine.

When used too often or in the wrong context, this strategy becomes problematic. This article explores the effectiveness of core bracing cues and offers alternatives for achieving spinal stability during movement and sport.

Suit of Armor

The intention behind cues like "brace the core" or "squeeze your abs" is to stabilize the spine and reduce the risk of injury. Because trainers and fitness instructors understand that the lumbar region is vulnerable to injury when unstable, they often take precautionary measures via abdominal bracing cues.

However, the effectiveness of a cue is not measured by the *intended* outcome, but by the movement strategy it evokes. When clients hear the terms "squeeze" or "brace" in reference to their core, the reaction is often to engage all of their local and global core muscles in a high-level contraction. While the local core muscles (such as the transverse abdominis and multifidi) are intended to work as spinal stabilizers, the appropriate function of the global core muscles (such as the rectus abdominis and oblique muscles) is to control and produce movement (Gibbons, 2001).

More muscle recruitment might sound useful, but in the case of functional core stability, it doesn't result in efficient movement.

"Bracing as an isometric contraction will prevent normal movement when the zones [i.e., lower, middle and upper regions of the body] must move relative to each other," says Joanne Elphinston, founder of JEMS Movement Systems. "Without this, we cannot use our myofascial relationships to store and release elastic energy, nor to use this system to help us dynamically stabilize," she says.

Further, a high-load abdominal contraction can interfere with normal breathing, reduce the available movement and stifle the transmission of force. It is also an energy costly strategy (Elphinston, 2008).

"The [abdominal bracing] strategy can influence our postural stability by diminishing our multijoint options for absorbing and accommodating to postural sway, and influence the calibration of intra-abdominal pressure, which is a dance between diaphragm, pelvic floor and abdominals," explains Elphinston. "If the abdominal wall is unyielding, the mechanism that adjusts this pressure as functionally appropriate is lost. Intra-abdominal pressure is one of our normal spinal-stabilizing mechanisms, so to alter its fine-tuned coordination with a blunt continuous contraction is problematic."

Put simply, a continuous abdominal contraction limits your ability to dynamically stabilize and prohibits the transfer of force between the lower and upper extremities. This translates to a limited capacity to perform functional movements, whether they are activities of daily living or sport-specific exercises.

"If you want to run fluently or hit a golf ball—both low-load activities—bracing will interfere with normal movement by inhibiting motion between the upper and lower torso, altering breathing mechanics and costing you needless energy," says Elphinston.

PEER FITNESS TIPS

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Spinal Stability: To Brace or Not to Brace?, continued...

Elphinston describes something called the “suit of armor strategy,” which involves stiffening the large trunk muscles to create high levels of stability. This strategy is useful for high-threshold protection in the sense that it restricts movement, but becomes problematic when the intention is to move freely (Elphinston, 2008)

Is Abdominal Bracing Ever Useful?

Before you decry this article as heresy and throw out whatever it is you’re reading it on, let’s explore how and when abdominal bracing is beneficial. If we consider the previously mentioned outcomes of abdominal bracing, we can understand the movement contexts in which it is appropriate.

Bracing for Impact

Because abdominal bracing increases rigidity around the trunk, it is a useful strategy when preparing for impact.

“If you need a short, sharp burst of high-force support, bracing will be your go-to solution,” suggests Elphinston. This can occur with sports where physical contact occurs, such as football, soccer or rugby. Maintaining a rigid torso against an oncoming load serves to stabilize and protect the spine against impact.

Heavy Lifts Performed in a Single Plane

When performing maximal or near-maximal lifts that occur in a single plane of motion, such as the deadlift, bench press or squat, abdominal bracing is a useful way to increasing intra-abdominal pressure and reinforce intersegmental stability of the spine (Hackett and Chow, 2013). Experienced lifters often use the Valsalva maneuver to achieve this outcome, which involves inhaling prior to movement execution and holding your breath while lifting to create high amounts of rigidity in the trunk.

Note: The Valsalva maneuver should be avoided for those who have been diagnosed with hypertension or an abdominal hernia, as an increase in abdominal pressure may cause additional harm in these cases.

Beyond Bracing

Without cueing abdominal bracing, how can you help your clients achieve trunk stability and move safely?

In contrast to the suit of armor strategy described above, Elphinston proposes the elastic support strategy, which allows for unrestricted movement in the limbs and efficient force transmission. Walking and running are excellent examples of this strategy; both employ diagonal elastic support—a constant diagonal stretch and release created by counter body rotation. This makes movement extremely efficient, allowing for the storage and transfer of energy from one area of the body to another (Elphinston, 2008)

A similar strategy can be seen in other rotational movements such as golfing, throwing or swinging a bat. In these scenarios, force is not created in the core, but instead is transmitted through the core.

Cueing Strategies

Your cueing strategies can promote abdominal bracing and compression or abdominal lengthening and stability through movement.

Bracing

- Squeeze your core
- Abs tight
- Brace your core
- Imagine you are going to be poked/punched in the stomach

Dynamic Stabilization

- Lengthen your spine
- Long line from the tailbone to the head
- Balloon posture (imagine a helium balloon tied to the top of the head)
- Head to the sky

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Spinal Stability: To Brace or Not to Brace?, continued...

Elphinston also describes linear elastic support. Imagine creating a line of tension by raising the arms overhead and forcefully throwing a ball. Tension is created through the eccentric lengthening of the anterior chain and force is transmitted as it contracts.

Elastic Support Strategy in Action

Stand up and move as if preparing to pitch a baseball or swing a tennis racket. Notice the elongation of the muscles around your trunk as your spine rotates and the change in distance between your pelvis and ribs. Return to the starting position. Brace your abdominals and initiate a high-force abdominal contraction. Maintain this contraction while attempting to perform the same movement. Do you notice a difference? You'll likely find that the rigidity of your torso limits your available movement in the second trial.

Stability Through Length

Another efficient strategy for creating spinal stability through movement is via lengthening rather than compression. Stability is not created by muscles; rather, it is generated by neuromuscular systems and myofascial relationships that involve appropriate motor patterns, which includes the timing, amount and sequencing of muscle activation (Elphinston, 2008).

To understand this concept, consider stable movement revolving around a central longitudinal axis (CLA). The CLA is not a fixed or rigid position, but a central line that supports appropriate multiplanar movement of the limbs. Elphinston describes the image of a thick cable running vertically from your head down through the middle of your body. This line remains connected even as you move through multiple planes and as the shoulders and pelvis change position. Imagine pulling on the two ends of a slack cord. Tension would increase without you having to "squeeze" the cord into place. In the same way, cueing for length can increase functional stability without the need for compression.

Imagine a client performing a single-leg Romanian deadlift. As he or she flexes at the hips, the trunk descends while the leg ascends behind the body. The position of the body moves while maintaining a neutral CLA. If there is a large bend in the line of the body or pelvic rotation, the CLA is not maintained. Cueing the client to "squeeze your core" will promote the suit of armor strategy and won't translate to efficient movement. Encouraging a client to drive the heel away from the head, however, will promote stability through length and more coordinated motor patterns.

This concept can be expanded into exercises outside of the sagittal plane. For example, when cueing a cable woodchop, rather than instructing your client to "brace your abdominals," you could instruct him or her to "reach your head toward the sky" to create a long line about which they can rotate. This promotes activation of the local core muscles, allows free movement of the pelvis and permits normal breathing patterns.

By expanding your cueing repertoire beyond abdominal bracing, you will be better able to help your clients move efficiently and effectively, both inside and outside of the gym.

Exercises to Encourage Dynamic Stabilization

- **Diaphragmatic breathing in multiple positions (e.g., lying down, quadruped, child's pose, cat/cow).** This exercise helps release tension in the global core muscles and facilitates appropriate breathing patterns.
- **Don't move me drill.** Have your client stand in various position while you make gentle perturbations and the client resists falling.
- **Bird-dog.** This exercise requires local stability with mobility of the hips and shoulders in a quadruped position. Cue a long line from the head to the tailbone.
- **Dead bug.** This exercise requires local stability with mobility of the hips and shoulder, but in the supine position. Regress this exercise as needed until spinal alignment is maintained without the need for abdominal bracing. Check that clients can breathe normally while maintaining appropriate spinal alignment.
- **Single-arm suitcase or water carries.** These exercises take the concept of fluid stability up off the floor and into a more functional movement pattern. Reach your head toward the sky rather than bearing down through the core.
- **Wood-chop.** This exercise encourages spinal stability while moving in the transverse plane. Cue a long line from the head to the tailbone.