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Rise Up!

Climbing stairs is a measurable, observable and repeatable activity.
Louis Hayes thinks more CrossFitters should add stair climbing to their daily WODs.

Louis Hayes

Staff/CrossFit Journal

This past year I stumbled upon a CrossFit message-board thread about exercises readers thought should be a part of CrossFit programming.

Some of the responses suggested sprinting, Turkish get-ups and throws. I happened to read the thread during my seasonal immersion in winter stair climbing, but my post suggesting "stair and hill climbing" went completely ignored by the other posters.

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A CrossFit Activity?

I wondered if I had too easily persuaded myself that climbing passes the fundamental three-pronged test of CrossFit: functionality, constant variation and high intensity. Why did no one else agree with me?

I believe climbing is a task that fits harmoniously within the CrossFit mandate. If one can't see climbing a few flights of stairs as functional, I ask, "What is more practical or lifelike?" The variety in stair climbing is infinite: speed, duration, skipping stairs, forward, backwards, carrying loads—these are but a few options. Lastly, for those who don't see climbing as a high-intensity activity, I'll race anyone to the top floor of a 20-story building and, when I catch my breath, argue about its intensity.

Stair climbing fits snuggly into the CrossFit world on so many fronts, but it wasn't until this last winter's stair-preparation season that I really appreciated my new methodology's compatibility with CrossFit. With the help of the power-output formula, I took my stair-race training to new heights via measurement, analysis and repeatability.

CrossFit Training: A Step Up

I have been doing stair-climbing events for about six years. I live in Chicago, a city with no shortage of buildings in which to hold a charity event. Stair season is between November and March—the cold, icy months when bike paths along Lake Michigan or in local forest preserves are devoid of activity. The popular buildings for events range from 31 to 103 floors: Willis (formerly Sears) Tower, Hancock Center, Aon Center, Oakbrook Terrace, Presidential Towers. Top finishers in those same events finish in under four minutes for 31 floors to under 14 minutes for 103. What I find to be immediately noteworthy is how these durations are very similar to the benchmark times for typical CrossFit named WODs.

In the past, I used myriad flawed methods in preparing for these stair-climbing events. I used the inefficient step-mill machine in my work gym. During climbs in actual buildings, I wrongly focused more on duration and less on speed. I frequently confused jagged, unstructured rest periods for interval training. Of course, I even bought a heart-rate monitor to gauge my progress. Each of these approaches left much to be desired on race days.

Courtesy of Louis Hayes

The author believes stair climbs—such as the 76-foot ascent in the Swallow Cliff Forest Preserve in Chicagoland—are a perfect complement to more traditional CrossFit movements.

Several years ago, I discovered CrossFit. Like many CrossFitters, I was drawn to one of the main pillars of its method: high intensity. In the months before a stair event, I alternate between general physical preparation and sport-specific training (stairs). There are three main venues for my stair-specific training:

A four-story, 35-foot fire-department hose tower.

An 18-story, 180-foot high-rise apartment building.

A 122-stair, 76-foot tall outdoor limestone staircase.

In times when I am not preparing for stair races, I still incorporate stair climbing into WODs. For example, the outdoor staircase is nestled within the Swallow Cliff Woods Forest Preserve of Cook County and once led to the top of toboggan chutes. It's been the site for quite a few group training sessions for my friends. The 76-foot rise pairs up nicely with pull-ups, push-ups and kettlebell movements. Our group meets twice per week at Swallow Cliff FP for workouts in the park.

I have near-unlimited access to each of these three venues, and each presents a different opportunity and challenge. During icy and windy times, the indoor facilities prove to be quite valuable.

Aside from adding gymnastics movements or kettlebells to complement the stair work, there are plenty of pure-climbing variations within stair training. A climber can use bodyweight only, wear a weighted vest, carry items—or any combination of those. Other variations include altering the speed of the climbs. Some climbers opt for the long and slow approach. Others sprint up, hitting only every other or every third step. Other techniques include side-stepping, hopping or climbing backwards. Whichever tactic is chosen, the power formula offers a measurable and repeatable way to quantify intensity.

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Staff/CrossFit Journal

There are no stairs at The Ranch, but climbing stairs might be one way to train for the hills of Aromas.

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The Power Formula

The power formula is easily applied to stair training because of the known values that can be plugged in. Look at the formula:

power = force x displacement/time

The force is simply the weight of the climber in newtons (N), the displacement is the overall height of the climb in meters, and time is the duration of the workout or event in seconds. The result of the equation is power, measured in watts (W). Therefore, the formula for watts is:

watts = newtons x meters / seconds

Here are some simple conversions:

To get kilograms from pounds, divide by 2.2.

To get newtons from kilograms, multiply by 9.8 m/s^2.

To get meters from feet, divide by 3.281.

I've used 100-foot tapes, notepads and a measuring partner to determine height. One of our training partners sent over a survey crew to our outdoor venue and even had the sarcasm to ask if measurements within one-eighth of an inch were accurate enough. We've had a guy measure stair-riser height and count stairs. We've taken data from building engineers. There are plenty of creative ways to obtain the data needed to make this work.

What is important here is not the unit of measurements but rather the consistency of the units. Power can just as easily be measured in some unique way, such as "flights" instead of meters. Whatever units are used, be sure to be consistent with your comparisons from workout to workout. I have developed a simple Microsoft Excel worksheet that allows me to plug in numbers and track our progress.

One word of caution on the use of power. Power is best suited to comparisons of one athlete over time vs. one athlete over another. Life demands the accomplishment of tasks, not the increase of power. A larger athlete might be slower but could still achieve higher absolute power. But, given the variety of staircases and the challenge of standardizing results otherwise, power is a great tool for tracking an athlete's progress.

Courtesy of Louis Hayes

Stairs workouts are easily measurable and repeatable—two reasons the author likes to include climbs in his WODs.

I ask not for WODs of four rounds of 20 floors and 20 pull-ups. What I do ask is for CrossFitters to keep an open mind to include movements that are not part of main-site programming.

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The Power Formula Applied

Look at the following climb: a 235-lb. man climbs a 387-foot staircase. It takes him 4:52 from bottom to top. Using the above formula, his power output is 422 W.

The same man climbs a 35-foot staircase 15 times while wearing a 25-lb. vest. He completes it in 17:30, and the timer does not stop during descents. Power output: 178 W.

The same man climbs a 75-foot staircase in 20 seconds. The power output is 1196 W.

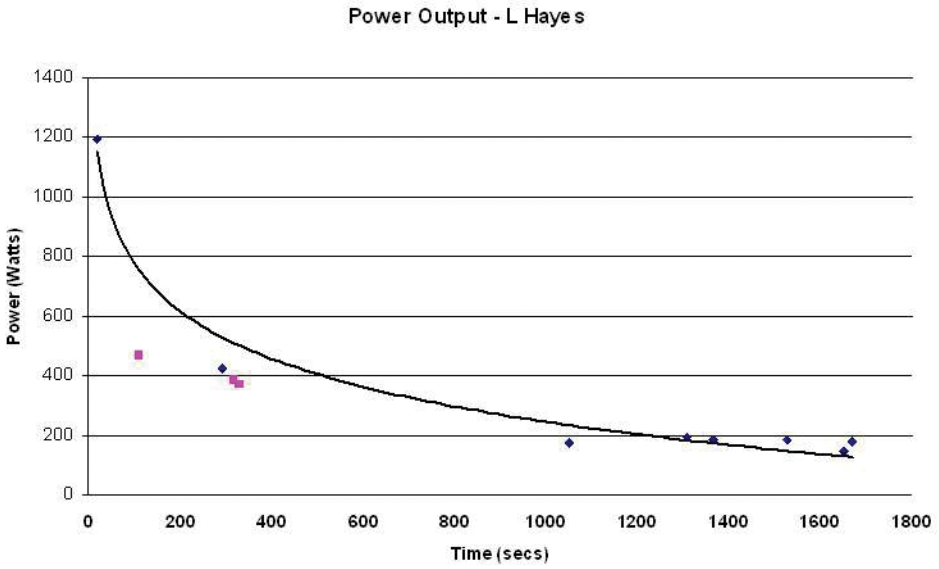
The same man climbs a 75-foot staircase 10 times in 27:30. Again, the timer does not stop during the descents. Power output: 145 W.

Consider the graph below. It plots time (in seconds) on the horizontal axis and power (in watts) on the vertical axis. These points are plotted from actual data collected during my stair workouts last winter. I also plotted some points I was able to dig up from past years' competitions.

It is reasonable to see the decrease in watts as the duration increases. This is a virtual law of human power output. It happens naturally in nearly all physical events. What is important is that as training progresses, the participant begins to plot points *above* the curve. The "control" curve might include data from the previous season or year. If new points are plotted above, this translates into more power and can create a new curve. As any CrossFitter knows, the area under that new curve represents increased work capacity.

The graph depicts three points from my pre-CrossFit days. As you can see, they are all below the curve derived from last year's data. This leads me to believe that my stair-specific training combined with CrossFit has produced measurable increases in physical ability.

Additionally, some CrossFitters have embraced yet another measurable and comparable statistic: watt per kilogram of bodyweight (W/kg). This has been a way for members in my training group to compare themselves against partners of varying statures. First off, due to the fact that weight is a critical component of the raw power output formula, the W/kg stat means very little. It does however have great application for other power studies such as a kettlebell snatch test. For stair climbing, I find the W/kg figure to be useful for competitors who lose or gain mass during the examined period, or those competitors who train under load. I frequently train with a weight vest or while carrying sandbags. The W/kg figure helps determine if training time is making my lean body mass more efficient.



The curve represents actual data collected during the author's climbing competitions last year. Particularly noteworthy are the "pre-CrossFit" points (pink) and the"post-CrossFit" points (blue). Many of the blue points fall above the curve, suggesting an increase in work capacity.

Stairing Contest

I understand why stairs aren't programmed into the main-site WODs, probably for many of the same reasons tire flipping is absent: near-impossible standardization and lack of equipment. For many CrossFitters, it's vitally important to measure ability against others, whether they're sharing a pool of sweat in the same gym or competing online from a theater of war on another continent. Adding stair climbing to the main site would spark the same whining as this: "Hey, my tractor tire is bigger and heavier than his!" The differences in stadium stairs and a high-rise fire exit are obvious and preclude any comparisons.

So I ask not for WODs of four rounds of 20 floors and 20 pull-ups. What I do ask is for CrossFitters to keep an open mind to include movements that are not part of main-site programming. Many followers already use garage-gym-friendly parallettes, sandbags, sledgehammers, rings and tires in addition to the equipment needed for the daily WODs. Some of those pieces of equipment do not lend themselves to moving large loads long distances quickly, and their use cannot always be measured. Stair work, on the other hand, can be accurately measured, quantified and analyzed, and the workouts are truly repeatable.

Look for staircases: they might be found in your work building, a local stadium, a friend's apartment high-rise, or a local hotel. Affiliates: I make the same challenge to you. Find a climb (or repeated climb) that becomes a benchmark for your members. Find a stair race in your area. I often find affiliates across the nation assembling teams for local charity events.

Go vertical. It will take your training to new heights.

✦

About the Author

Louis Hayes is a police officer with the Hinsdale (Ill.) Police Department, assigned to the FIAT SWAT Taskforce. He also sits on the board of directors for the Illinois Tactical Officers Association. He's been climbing stairs since he was eight months old, and all the learning bruises are long gone. Louis was the author of the CrossFit Journal article SWAT Shapes Up in March 2009. He also contributes to a for-the-good-of-mankind blog called Trinity Training Group. Louis can be reached at louis.hayes@comcast.net.

Courtesy of Louis Hayes

The author (wearing cap) and a few of the regulars pose with some of the equipment used during stair-climbing WODs.

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