Indiana University Bloomington

Physical Plant PERSPECTIVE

Winter 2001

Weather station measures up

— *Electronics department records weather data*

Every five minutes at the Old Highway Garage on East Tenth Street, just before the curve under the train track, sensors measure and transmit the dew point, wind speed and wet bulb temperature for everyone to read. These odd names are just a few of the data components collected by the new weather station installed by Physical Plant Electronics Technicians in June 2000. While the station provides data for technicians, an accompanying weather station web site debuted in November 2000 as a resource for everyone.

Chuck Sheppard, Associate Director for Physical Plant, and Andrew Lowry, Electronics Manager, initiated the project almost two years ago during discussions about upgrading Physical Plant electrical systems. Constructing a weather station, Lowry explains, "provides a cost-effective addition to the Physical Plant, and helps the plant achieve its goals for creating and maintaining a comfortable campus environment."

Master Electronics Technician Greg Gember checks on the weather station which is located outside of Campus Division, east of Eigenmann Hall.

"I was 100% confident that we could do this because the project tapped into their personal backgrounds and strengths."

— Andrew Lowry, Electronics Manager

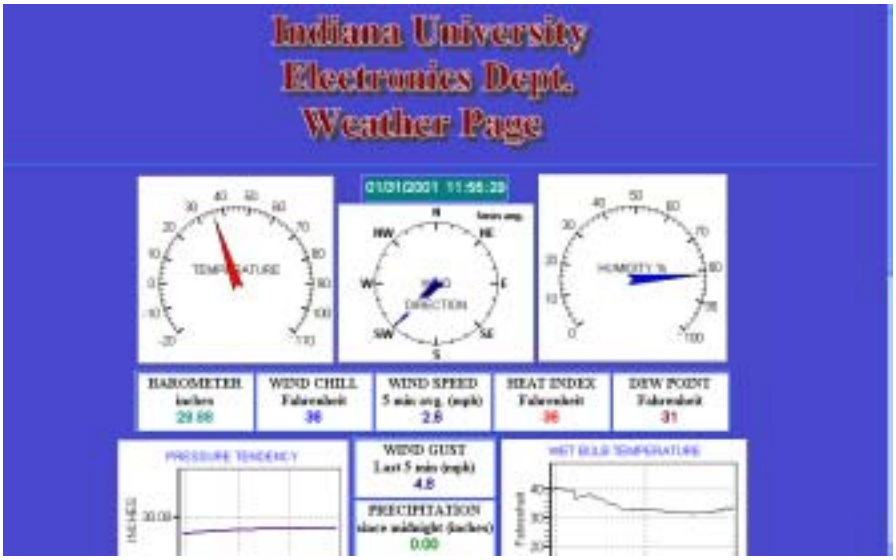
Project tapped special talents

Lowry, in charge of overseeing the project, states, "The weather station presented a fun, interesting and challenging project to Electronics." He enlisted Master Electronic Technician Greg Gember and Design Technician Dan Fox to design the weather station and bring its web site on-line.

... continued on next page

Weather station measures up
(continued)

Lowry recalls, "I was 100% confident that we could do this because the project tapped into their personal backgrounds and strengths." Gember, who spent four years in the Air Force as a weather observer, utilized his background training to understand the needs of this project, consulting with the National Weather Service and visiting the Franklin, Indiana, Wastewater Treatment Plant to study their weather station. Fox tapped his computer knowledge to test the boundaries of the computer software programs for the project: "We got to try and use software in ways that it had never been used before."



A screen capture from the Electronics web site. To check the latest weather data go to http://electron.electronics.indiana.edu/weather

More than a weather vane

The weather station is made up of a group of sensors that measure climate activity including air temperature and pressure, humidity, wind speed and wind direction. The sensors are connected to a computerized data collector that triggers sensor measurements every five minutes. A computer software program processes and transmits the resulting data back to the computer server, which displays the constantly updated results on the server and the web site. Additionally, the web site offers daily weather highs and lows for the previous seven days.

Collecting weather data offers new dimensions to the decision-making process for running the Physical Plant. For example, during the summer, measuring the ambient temperature and dew point helps optimize the operation of the Central Chilled Water Plant which provides cooling for most university buildings. According to Lowry, "If we know what those temperatures are, we can save energy by adjusting the speed of the cooling tower fans." At the Central Heating Plant, storing data helps build models for planning how much steam will be needed over a 12 to 24 hour period. Operators can know what steps to take to maximize energy usage and cut overall operating costs.

Weather affects everybody

Beyond the Physical Plant, the weather station web site offers an efficient way to disseminate useful information. As Lowry explains, "Weather affects everybody. It's probably the only thing in the world we all have in common. Since we are a public institution and disseminators of information, the weather station and web site serve as a public service to ourselves, the other departments within Physical Plant and our larger academic community." For instance, Gember points out, "In the summertime, it is a good idea to check the weather station web site before going out to exercise since it lets you monitor the various levels of temperature and humidity and then you are better able to make a decision about how to prepare for your workout." Plans to link the web site to other IU web pages are currently in the works, and interested parties should contact the Physical Plant Electronics office at 855-6944.

Visit the Electronics Weather Station web site at: http://electron.electronics.indiana.edu/weather

IAPPA 2001 a success

Indiana University Bloomington Physical Plant is a member of IAPPA (Indiana Association of Physical Plant Administrators) a group of higher educational professionals in facilities management from around the State of Indiana. IAPPA's purpose is to share knowledge and resources with peer institutions to strengthen our colleges and universities in Indiana.

Recently, IU Bloomington Physical Plant hosted the IAPPA 2001 Conference at the Indiana Memorial Union bringing together directors, managers and first-line supervisors to tackle issues facing higher education facilities. More than 120 Physical Plant administrators from around the state attended the event.

Much praise came from Conference Host, Assistant Vice President Gary Kent, for the team effort exhibited by IUB Physical Plant staff. Many local staff presented sessions, led tours and worked behind the scenes to make IAPPA 2001 a solid success.

For the conference participants, IU was pleased to have as the featured speaker an exemplary presenter in the field of work improvement, Thiagi, whose real name is Dr. Sivasailam "Thiagi" Thiagarajan.

Thiagi is the president of Workshops by Thiagi, Inc., an organization with the mission of helping people improve their performance effectively and enjoyably. He has a long association with the IU Instructional Systems Technology graduate program here in Bloomington and his presentation was well received by all attendees.

Several of the IAPPA members in attendance presented topics or participated in panel discussions during the conference. These topics covered a wide range of higher education issues:

- Measuring Job Performance
- How Facilities Departments Support Personal Safety
- Update on Grounds Care
- Energy Issues & Challenges
- High-Tech Buildings & Class
- Time Priority Management
- Effective Communication Styles
- Trends in Student Housing
- Diversity & English as a Second Language
- Two-Pipe Systems for Utilities
- How to Improve Work Results
- Update on Worker's Comp & Family Leave
- Trends in Recycling
- Update on OSHA & EPA Regulations

After panel discussions and speaker presentations, administrators noticed that further discussion is needed in the areas of OSHA regulations and energy issues. In order to discuss these pertinent issues before next year's conference, two follow-up, one-day conferences will occur this summer in the Indianapolis area.

Next year's IAPPA Conference will also take place at the IU Bloomington campus. The dates for the 2002 conference are February 20-22. If you know of individuals, yourself or others, who would be willing to present a session or help plan the program, the 2002 Program Committee meets by weekly conference call in September and October and more members are needed. Please contact Cindy Stone at stonec@indiana.edu or call (812) 855-6296 to express your interest. ■

***Perspective* is published quarterly by the Indiana University Physical Plant Training & Development Office. It is prepared in-house with *PageMaker*, a desktop publishing program.**

Paul Schneller, *Editor & Coordinator of Development*
Cynthia Stone, *Layout & Design*
Amberly Thayer, *Layout & Design, Writing and Photos*
Liza Trevino, *Writing and Photos*

Mail:
2931 East Tenth Street
Bloomington, IN 47408
Phone: 812.855.6296
Fax: 812.855.9549
E-mail: schnelle@indiana.edu
stonec@indiana.edu

World Wide Web:
http://www.indiana.edu/~phyplant

If your address is incorrect, or if you no longer wish to receive *Perspective*, please let us know so we may update our mailing list.

Printed by IU Printing Services on plant-based paper (no trees used). Please recycle this issue when you're done reading it.

E-notes

Over the last few years, we have moved toward more advanced e-mail software and tools. This column offers practical tips on the more advanced options available with new e-mail programs.

Jon Compuwhiz
Technology Manager, Physical Plant
joncompuw@indiana.edu
700 N. Walnut Grove
Bloomington, IN 47405 (812) 555-1234

Signature lines

Signature lines are the letterhead of your Internet correspondence that are attatched automatically at the end of your messages. Here are some guidelines for using this option if your software has this feature:

- Use your automatic signature when communicating with people who may not know you.
- Use your signature when sending to a group of subscribers.
- Include your name, position and affiliation.
- Include your e-mail address.
- Optional information could include your address and phone number.
- Don't use the signature line when communicating with familiar co-workers.
- Don't exceed more than five lines

— *Adapted from "The Net: User Guidelines and Netiquette" at www.logan.net/help/netiquette.html*

Physical Plant facts

We have approximately 705 full-time clerical, technical, craft and administrative employees in our department. With this staff, we service:

- **over 13 million square feet of building space**
- **more than 250 campus buildings**
- **more than 2,000 acres of landscaping, lawns, sidewalks, parking lots and streets**
- **more than 180 miles of utility distribution systems**
- **195 elevators, 20 chair lifts, 13 dumbwaiters and 7 escalators**
- **3,000 outdoor lights**
- **1,800 restroom stalls**

We process close to 70,000 service requests annually.

We are the largest customer of PSI Cinergy, spending $9 million annually on electricity for the campus.

We distribute 900 million gallons of water a year (25% of the City of Bloomington's annual production).

We produce 1.8 billion pounds of steam annually for heating and other needs. ■

Physical Plant Profiles

Utilities: Tim Stout

Utilities Worker

Tim Stout has been with the Physical Plant as a Utilities Worker since April 1999. He began the Utilities Instrumentation and Control Trainee program in January. This new direction enables Stout to apply his Associate Degree in Electronics Technology earned from Ivy Tech State College.

Each day, Stout reports to Operations Supervisor Mark Moser in the Central Heating Plant to check on the day's work orders. From that point on, however, there is nothing routine about Stout's workday. He states, "You could work every day for months and not do the same thing twice." Stout's duties include maintaining the controls for the water system and boilers.

Due to the variety of his duties performed at the Central Heating Plant, Stout is provided with protective gear including a hardhat, goggles, earplugs and a uniform. Yet, as Stout explains, "It is the heat from the steam coming off the boilers that makes the job difficult. Even with all the gear, nothing can stop it from being hot." Among his favorite duties, Stout enjoys working with the newly installed chart recorders that monitor boiler controls.

Since beginning the trainee program, Stout has spent more time studying and asking questions. "There's so much to learn. Before, I just got little pieces of the puzzle depending on what job had to be done. Now, I'm learning how it all fits together."

For the past 13 years, Stout also has worked as part-time parking lot supervisor for Assembly Hall during the IU football and basketball seasons. Away from the Bloomington campus, Stout is involved with the Bloomington Young American Bowling Alliance (YABA) and enjoys hang gliding around southern Indiana. "It's something I always wanted to do since I was a kid and finally learned how about seven years ago." ■

Building Services: Bruce Shaver

Custodian

Custodian Bruce Shaver arrived at IU almost two years ago. Though he reports to work for the night shift from 10 p.m. to 6:30 a.m., his presence is felt throughout the day.

Shaver works with a team of three other custodians currently assigned to the area that includes the Law School, Lindley Hall and Wylie Hall. While working for IU, Shaver has become familiar with the entire campus, since reassignments occur often. Shaver explains, "We are rotated to different areas so that we can get to know the different buildings and the work they need."

His workday begins when Shaver clocks in at 10 p.m. to meet with his supervisor, team leader and team members. At that time, they assess any special service requests that came in the previous day and decide who will perform what duties for the evening. Each night, Shaver and his team members clean their assigned buildings' public spaces, classrooms and bathrooms. They also clean the offices on a rotating basis, with different floors assigned on different days.

The most hectic time of the day for Shaver is early in his shift. After dividing up the duties, timing is important in order to complete the job. "There's so much to do that, if you don't get a jump on the day, it's easy to get behind." The fall and winter seasons tend to be the busiest for Shaver due to the snow, sand and water tracked into the buildings over the course of the day.

According to Shaver, his job is made easier by the friendly atmosphere among his team members. "Everyone helps each other out when one of us finishes our particular job early. It makes the time go by faster when there is cooperation."

Shaver enjoys reading about history, particularly WWII military history. He hopes to one day take advantage of free tuition benefits as an employee and enroll in IU classes to earn a bachelor's degree either in history or computer science. ■

Building Maintenance: Leonard Butler

Electrician

Before joining the Physical Plant in December 1999, Electrician Leonard Butler spent 34 years with Thomson Electronics. Though eligible for retirement when Thomson closed down, Butler instead decided to continue putting his electrician's license and years of experience to use as a new member of the Building Maintenance Night Operations crew.

Butler works the second shift from 4:15 p.m. until 12:45 a.m. on a multi-craft team whose primary goal is to answer all IU emergency maintenance calls. Butler is part of a crew made up of a plumber, two heating mechanics, one electrician, one refrigeration mechanic, four other night employees and two apprentices. Butler feels his crew members make the job easier. "There is never any trouble finding help. We all work well together and that always helps."

Unlike the Building Maintenance day staff where many are assigned to specific campus zones, Butler's crew answers service calls for the entire IU campus. Butler's duties include fixing and diagnosing electrical problems such as power outages, and assisting with non-electrical job requests like plumbing and water boiler problems. They have even responded to a service request at the IU-operated Brown County Playhouse in Nashville, Indiana, when water began filling up its basement.

The busiest time on campus for Butler is when students are in session and classrooms are in heavy use. Explains Butler, "More classrooms with computerized lighting systems and podiums, remote-controlled screens and audio-visual equipment are targets for frequent breakdowns." Increased security for the high-tech classrooms also causes delays when access keys and alarm codes are not provided to the maintenance crews. Says Butler, "Sometimes the department has the only key to get at the necessary equipment. So, we have to wait for someone from that department to arrive."

Butler prefers working the second shift so that he can pursue his hobby during the day hours. Butler enjoys construction and has built three houses from scratch over the years. He recently completed a fourth home in Kentucky for retirement. ■

Quarter century club growing

This winter, five employees each celebrated 25 years of Indiana University service with Physical Plant. The new "Quarter Century Club" members are:

- **Carl Allen –** *Receiving & Stores*
- **Bob Burton –** *Night Operations*
- **Scott Davis –** *Carpentry*
- **James Fulk –** *Paint Shop*
- **Paul Whiteman –** *Carpentry*

These five veteran workers join the ranks of 130 current Physical Plant workers who have worked a quarter of a century or more.

Congratulations to these experienced employees and thanks for all the years of service and dedication!

Carl Allen
Receiving & Stores

Bob Burton
Night Operations

Scott Davis
Carpentry

James Fulk
Paint Shop

Paul Whiteman
Carpentry

Facilities snapshots
— *Joseph A. Wright Quadrangle*

Facilities Snapshots *is a recurring column featuring IUB campus buildings. Thanks to Julie Stines from Bureau of Facilities Programming and Utilization for submitting facts about the building in this issue.*

Governor Joseph A. Wright Quadrangle

Joseph A. Wright Quadrangle

Trivia question: When viewed from the air, Wright Quadrangle forms the shape of what letter? *(See box below)*

Wright Quadrangle opened in 1949 as a dormitory and was known as Men's Quadrangle because at that time only men lived there. Wright Quadrangle became co-ed in 1970. The building cost $4.5 million and took two and a half years to construct. It was financed through bonds that were paid off by the rental of the building's facilities. State funds were not used. Wright Quadrangle at its highest has five levels. The building has a gross square footage of 320,796 ft.

In 1959, the residence hall was renamed after Indiana's governor during the Civil War, Governor Joseph A. Wright. Wright was also one of the first to attend Indiana Seminary and is credited with originating the Indiana State Fair. Wright was famous for saying, "Indiana knows no east, no west, no north, no south, nothing but the Union."

Wright Quadrangle features a large cafeteria that has been used for dances, concerts, debates, movies and even boxing matches. In fact, the Glenn Miller, Louis Armstrong and Tommy Dorsey bands once performed their music in the cafeteria. Because Wright's dining furniture can be removed quickly, it is a popular and practical place for these events.

In 1956, Garo Antresis created the murals that adorn Wright Quadrangle's cafeteria. The paintings depict different time periods in the history of IU. The murals cover 1,080 square feet of canvas on six large panels. Each of the panels is six feet wide and 30 feet long.

Other features of Wright Quad include 18 units or "houses" where students live and a chapel that is located in Dunn House. The main lounge was once known as the "Waldorf of Jordan" because of it's plush furnishings. The residence hall also has a center store that sells drinks, snacks and necessity items for the 1,070 residents who live there today. ■

Trivia answer

When viewed from the air, Wright Quadrangle forms the shape of the letter "H".

Who do I contact?

— The difference in small jobs & bigger ones

They may sound like the same thing — a "Service Request" and a "Request for Service" — but they're not. Small jobs done by Physical Plant are Service Requests. Physical Plant handles nearly 70,000 Service Requests each year. They can get a small job or even a slightly bigger job in motion.

However, major construction projects are handled through the University Architect's Office and the Department of Facilities with a "Request for Service".

A Small Job *A Service Request*	**A Bigger Job** *A Renovation Project*	**A Major Project** *New Construction*
Fix a broken light	Redesign the lighting in a classroom	Upgrade the electrical system for a building
Fix a leaking toilet	Install new partitions in a restroom	Increase the capacity of sewers on your campus
Fix a torn carpet	Replace carpet	Reconfigure a large office suite and install new finishes such as carpet and paint
Contact Physical Plant staff for a Service Request	**Contact your Physical Plant staff and they will involve other Facilities departments on your behalf**	**Contact the University Architect's Office for a Request for Service (RFS)**

IUB customers may contact Physical Plant in a variety of ways for a Service Request (Small Jobs):

- Web Work Request Form – http://www.indiana.edu/~phyplant
- E-mail – phypltbl@indiana.edu
- Phone – 855-8728 (emergency or urgent requests, please)
- Fax – 855-7742
- Campus Mail – Physical Plant Service/Operations Center / 700 N. Walnut Grove /IUB

Customers contact the University Architect's Office or the Department of Facilities in a variety of ways for a Request for Service (New Construction or major projects):

- Web Request for Service (RFS) – http://www.indiana.edu/~uao, or, http://www.indiana.edu/~univfac
- E-mail – rmeadows@indiana.edu or mcrowe@indiana.edu
- Phone – 855-3525 (UAO) 855-7106 (Facilities)
- Fax – 855-9387 (UAO) 855-5635 (Facilities)
- Campus Mail – University Architect's Office or Department of Facilities / 700 N. Walnut Grove / IUB

Key points to remember: A Request for Service is also needed when it involves interior design work, a change to the exterior of a building, code issues, outdoor signage, major landscaping, etc., and whenever the cost exceeds $50,000.

From the Personal Safety Commission

In 1993, Indiana University Bloomington, was ranked as one of the top five "most scenic campuses in the U.S." The report added that "Little Red Riding Hood would be quite at home on the Bloomington campus." Such praise for the pastoral charm of this campus is welcome. Yet we must remember to be careful, and keep our own safety in mind whenever we go out. (Even Little Red Riding Hood could have benefited from good common sense…)

With that in mind, we offer the following suggestions for addressing your own personal safety in the workplace, traveling to and from the workplace, and at home.

Safety in the workplace:

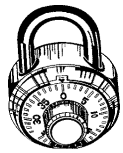
- If you're working alone, especially late in the evening or on the weekends, keep your office doors and windows locked.
- If you have multiple entrances to your area or building and you're alone, even during the workday, lock all but one entrance, and hang signs on the locked doors saying something like "door closed today, use main entrance to the east…" so you can better see who enters your building.
- After hours, don't let any strangers in – just tell them the office is closed. IU custodial and maintenance staff have their own keys; you don't have to let anyone in!
- Why not find out who has keys to your office doors? If you can't get control of the keys (e.g., former workers still have keys, or it's been a long time since locks were changed), get new keys made by Physical Plant for your area or building.
- Did you know that you can call 9-1-1 and hang up and IUPD can still identify your phone number and office location? This is good to know if you need help and couldn't talk or had to quickly leave the are.
- If you or a co-worker are going through a divorce or separation and you've obtained a restraining order, notify IUPD. Tell them where you work, who you have the restraining order against, etc.
- If you see campus lights out, call 5-8728. This phone is answered by Physical Plant staff 24 hours per day; lights can be replaced quickly.

Safety between home & the workplace:

- Don't go out and walk alone at night – walk with a co-worker.
- If you don't have a colleague to walk with on the walk back to your car at night, why not call IU Safety Escort (5-SAFE) to pick you up at your office door and take you to your car? It's free, and the wait time is usually under 15 minutes.
- Did you know that any IU decal can park in an "A" space after 5:00 p.m.? The only exception is spaces marked "24 hour 'A' zone." If you are working late, why not move your car to an "A" space closer to your office entrance?
- Be aware of your surroundings. Avoid dark or hazardous areas.
- Be alert. Walk confidently and pay attention to who is behind you.
- Have your car keys out and ready to use. Don't get into your car without looking into the car, especially the back seat.
- Know where the nearest emergency phone or pay phone is on the path between your office and your parked car.
- Remember 9-1-1 works on a pay phone, no coin needed.

Safety at home:

- Lock your doors – your home or apartment door, your garage, your office door, your car door, etc.
- Get deadbolt locks on every entry door at home – if you haven't had your locks changed in the past 2-3 years, then you should, and upgrade to deadbolts at the same time.



... continued on next page

From the Personal Safety Commission
(continued)

- Do you have solid core exterior doors? Hollow ones are easier to break down.
- Do you have bushes or shrubs obstructing the view of windows or doors? Someone could hide behind them or use them as climbing devices to break into your home.
- Do you have adequate outdoor lighting around your home? Consider installing motion sensor lights. When you walk or drive up to your house, the lights are triggered to turn on.

- Sliding glass patio doors may be a hazard, even with a board on the track, the door can still be lifted straight up and out on many older patio doors – have someone check them out.
- Don't let someone you don't know into your room, into your home, into your car. Ask yourself these three questions:

Were you expecting this person? Do you know this person? Can s/he identify her or himself with an ID, badge or uniform? If you can't say yes, don't answer the door. They'll leave a note, or come back later when you're not alone.

- Let your neighbors know when you are going away, and stop your mail and newspapers.
- Did you know you can have your address removed from the phone book? (It costs a one-time fee of $20 for Indiana Bell/Ameritech to do this.) ■

Lights out?

If you see outdoor lighting that needs repair or replacement anywhere on campus, call Physical Plant at 5-8728 to report the location — anytime, day or night. Physical Plant staff will answer this line 24 hours per day. Lights can be replaced quickly.

Car trouble?

Call 5-9849 for free Motorist Assistance with a dead battery or flat tire or if

you're locked out or out of gas (for personal vehicles with a valid IU parking decal).

Improving Job Performance

Is it broke? (Part Four)

In the last three issues of this column, we looked at i**dentifying symptoms** of a job performance problem, **labeling** the problem and **determining the root cause** of the problem. In this issue, we'll look at how to **choose the best solution** for the problem.

"Choosing the best solution" means that you look at many options to solve the problem. You must develop a list of possible alternatives that address the root cause of the problem and resolve it once and for all. There are several very good reasons for developing "optional solutions":

- A list of options keeps you from jumping on the first good idea. First is not necessarily best – it could turn out to be inadequate, or make the problem worse, or even create other problems.
- A list of options allows you to get input from everyone involved in the problem. You want to be sure you hear all sides and views. Yes, this takes time. Yes, there may well be strong differences of opinion. But it will help develop a more positive environment for implementing whatever the solution turns out to be.
- No one can think of everything. Even the best managers and supervisors can use input from workers, customers, suppliers and their other supervisors to find the best solution to a problem. Thinking "outside the box" is often done best by getting as many different ideas as possible and letting them create unexpected results.

There are three ways you can generate a good list of optional solutions. These techniques will help you identify a basic approach, not specific tasks.

Recovery – getting ideas from your earlier notes and research when you were identifying symptoms, labeling the problem and determining its root cause. This may include previous attempts to solve the problem.

Brainstorming – get people to offer any strategies that have even the slightest chance of solving the problem. Anything goes. Get rid of any inhibitions.

Force-field analysis – identify things that would make the problem better and things that would make it worse. Doing this can stimulate thinking that might lead to the best solutions.

Whichever approach you use, be sure to keep a worksheet on which you state the root cause to be solved, and list all the strategies that have any chance of working. Once you have as many optional solutions as you can come up with, you are ready to evaluate those options.

Here are some ways to make a decision on the best solution:

- **Informal discussion:** Gather a group of those involved in the problem and discuss the options – think out loud, bounce ideas around, identify advantages and disadvantages of each solution.
- **Brainstorming:** Although this can at times lead to less than a balanced equation, it has some value if you ask questions like, "Which option seems most workable?" or "Which solution can everyone decide to fully commit to?"
- **Elimination:** Use specific factors such as cost, time, risk, etc. to disqualify optional solutions in terms of whether or not they contribute to achieving those goals.
- **Weigh against consequences:** Look at the potential *costs* and the potential *risks*, vs. the possible *benefits* and *rewards* of each optional solution. Then decide if those benefits and rewards justify the potential costs and risks.
- **Prioritize:** There are a number of ways to do this.
  a. You can **rank** the solutions in terms of any of these criteria: best, most workable, most reliable, most tested and proven, least risky, staff ability to make it work, chance for success.
  b. **Force choices** by taking the first two solutions and deciding which is better; if the second wins, move it to the top of the list. Continue with each paired comparison until one is left.

... continued on next page

Is it broke? (Part four)

(continued)

c. **Everyone rates** each option using a scale (for example, 5 is best, 4 is next, etc.). Add up the ratings for each option and select the highest-rated one.
d. **Majority vote** rules.
e. **Compromise** when there is no clear-cut favorite.

Whatever your final choice, be sure it is **workable**. The solution should

- solve the problem and root cause
- satisfy all established criteria
- satisfy all people involved and affected
- allow workable implementation plans to be developed
- fit any time limits
- be accomplishable with existing personnel and resources
- end the recurrence of the problem
- consider all risks, disadvantages and consequences

Remember: Up to this point, you have only selected a strategy. You still must put that strategy into *action*. Tune in next issue for how to do that.

New journey craftworkers

Recently, six new craftworkers completed the IU Apprenticeship Program (IUAP) and became the newest journey level craftworkers in Physical Plant. **Kevin Ashley** and **Thomas Lirot Jr.** completed the apprenticeship program in carpentry in December 2000. **Rick Killion, Randy Redus** and **Brian Smith** finished electric apprenticeships in November 2000. **Jon Weisman** became a heating mechanic in January 2001.

As members of the IUAP, these apprentices performed at least 1,800 hours of on-the-job training and 144 hours of classroom instruction during each year of their four apprenticeship years. Congratulations to these new IUAP graduates for all of their hard work in the classroom and on the job. We wish you the best in your careers at IU.

Kevin Ashley
Carpenter

Rick Killion
Electrician

Thomas Lirot Jr.
Carpenter

Randy Redus
Electrician

Brian Smith
Electrician

Jon Weisman
Heating Mechanic

Working Safely

Material safety data sheets

If you may be exposed to a hazardous chemical while doing your job, you have a right to have information and understand procedures about that chemical. Your right to know is provided by the Hazard Communications Standard created by the U.S. Occupational Safety and Health Administration (OSHA).

One of the key pieces of information that your employer must provide to you is called the "Material Safety Data Sheet" – MSDS, for short. An MSDS must be provided for **each chemical** in your workplace. It identifies the chemical by name. It also tells you

- the hazard of the chemical
- the conditions that make it most hazardous
- how to protect yourself, others and the environment
- what to do in an emergency involving the chemical

Your employer must provide the MSDS on paper or computer, and must make it easy for you to get to the MSDS. Your employer is also required to train you so that you understand each MSDS and can use the information it contains. The MSDS may contain technical or scientific language, but you need to become familiar with it in order to do your job without risk.

Be sure you know where to find the MSDS for your job. Always read it and take the proper precautions before starting a job involving a chemical.

Here are some of the main things you will find on an MSDS:

Chemical identity

- common name
- chemical name
- hazardous ingredients
- manufacturer's name address, phone number (or the firm that supplied the MSDS)
- how much exposure you can have without health risk

Physical hazards – Will the chemical

- catch fire?
- explode?
- react dangerously if exposed to air, water or other chemicals?

Characteristics of the chemical

- normal appearance and odor
- boiling point
- melting point
- freezing point
- solubility in water
- specific gravity (will it sink in water?)
- vapor density (will it rise or sink in air?)
- vapor pressure (how fast will it evaporate in air?)

Dangerous reactions

- Stability (will it break down over time? Will it react to heat, shock, pressure, etc.?)
- Incompatibility (will it react with certain chemicals, air or water?)
- Hazardous decomposition products (if it breaks down, will new hazards be created?)
- Hazardous polymerization (will it react by itself?)

Health hazards

- Routes of exposure (inhaling, swallowing, eye or skin contact)
- Type of exposure (immediate or long-term effects)
- Specific health effects from exposure (burns, breathing, etc.)
- Body organs that might be affected (lungs, eyes, etc.)
- A potential cause of cancer
- Signs and symptoms of exposure (headache, nausea, etc.)
- Medical conditions that could be worsened (asthma, etc.)

An MSDS will tell you what to do if you are exposed. For example:

- Flush eyes at an emergency eyewash
- Remove contaminated clothing and thoroughly wash skin
- Get fresh air

If you think you have been overexposed to a chemical, **report it immediately to your supervisor.** ■

IU GPS joins satellite network

Under the IU Bloomington campus lie hundreds of miles of utility pipes, power cables, tunnels, sewers and energy management wiring. According to Associate Director for Physical Plant Chuck Sheppard, original plans mapping IU campus utility systems are over 50 years old and do not provide enough detail. Installing global positioning system (GPS) technology enables the IU geographic information system (GIS) team to precisely map current utility lines, locating them for maintenance without unnecessary digging that costs time and money and can sometimes result in breaking pipes and other equipment.

"Even when you're looking out into an open field, you'd be surprised what's buried underneath. The GPS gives latitude, longitude and elevation point information that helps us locate the underground lines much more quickly and accurately than in the past."

— Mike Farris, Utilities Documentation Technician

Satellite technology

The GPS was originally established by the U.S. Department of Defense for marine navigation. The system combines satellites and advanced computer technology to provide the exact latitude, longitude and elevation of a given point or object. Several components make up the GPS: a group of space *satellites*, a base station *receiver* anchored into bedrock and *rover kits* for field technicians to access the data. Twenty-four space satellites continuously orbiting the earth relay signals from an atomic clock that can be used for locating objects. Defense Department encryptions placed on the satellite signals required the IU team to construct a local base station as a reference point for getting precise locations. Our GIS team constructed a cylindrical concrete structure (called a "monument") that stands almost eight feet tall to house the GPS antennae in an open area for good reception. With a rover kit (a portable unit with a GPS antennae, GPS receiver and receiver radio) taken into the field, the GIS team can gather data from the satellite signals.

Utilities Documentation Technician Mike Farris has first-hand experience working with GPS. Farris explains, "Even when you're looking out into an open field, you'd be surprised by what's buried underneath. The GPS gives latitude, longitude and elevation point information that helps us locate the underground lines much more quickly and accurately than in the past." For example, GPS now enables IU Landscape Designer Mia Williams to map the location coordinates of a potential landscaping site with precision.

A collective effort

Under the direction of Chuck Sheppard, GIS Coordinator Amy Inman spearheaded the GPS initiative by researching the technology that would best meet the needs of the GIS team. Inman collaborated with Electronics Manager Andrew Lowry to find a suitable location and to enlist the expertise of the electronics staff including Design Engineer Dan Fox. With the

... continued on next page

Left, **Utilities Documentation Technician Mike Farris displays a GPS receiver that is part of a rover kit. Rover kits are used for accessing data and locating objects that lie below the ground's surface.** ***Right,*** **Farris uses the rover kit in the field.**

IU GPS joins satellite network

(continued)

support of Dean Tony Mobley and Associate Dean David Gallahue from the School of Health, Physical Education, and Recreation, an appropriate location was made available on HPER grounds.

Inman also contacted IU Geology Professor Michael Hamburger to enlist his expertise in GPS. Explains Hamburger, "With modest alterations of the initial plans for radio communication as well as the initial siting, the GPS also would enable geologic research opportunities on earthquakes and other seismic activity here in southern Indiana and the Wabash Valley."

Successfully meeting stringent construction standards for the base monument earned the IU GPS project accreditation with the National Geodetic Survey (NGS), an organization that develops geographic surveying procedures and sets procedural standards for GPS data transmission; IU now serves as one of the sites in their National Continuously Operating Reference Stations (CORS) system.

The local community can also utilize the GPS. Inman hosts meetings to acquaint potential users with the technology. Inman explains, "Before the monument was installed, local surveyors could not afford to use this technology. Now, all they need to purchase is the rover kit, which is much more economically reasonable, and they can use GPS to get even more accurate readings."

Assistant Vice President for Facilities Operations Gary Kent agrees the GPS is a welcome addition to the IU campus. Kent states, "Facilities has recognized the role of rapidly changing technology, and our staff has made outstanding decisions regarding technology like the Global Positioning System. By using the tools available, we can continue to serve our customers in a timely, efficient and effective manner."

If you would like to learn more about global positioning systems, see http://www.trimble.com/gps This is the manufacturer of the IU GPS system. Trimble pioneered the use of differential GPS that enabled civilian users to get high precision. ■

Physical Plant GIS team

Mike Farris	**Utilities, *Document Technician***
Dan Fox	**Electronics, *Design Engineer***
Amy Inman	**Utilities, *GIS Coordinator***
Andrew Lowry	**Electronics, *Manager***
Mia Williams	**Architects' Office, *Landscape Designer***

From:
Training & Development Office
IU Physical Plant
2931 E. 10th St.
Bloomington, IN 47408

CAMPUS MAIL