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# PMP Pest Management PROFESSIONAL

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## Set sail

Three industry consultants help cruise lines implement IPM strategies for bed bugs and other pests.

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# CSI's Combination Chemistry helps fight resistance

BY DR. JANIS REED | PCO Technical Services Manager, Control Solutions Inc. (CSI)

**T**he common bed bug, *Cimex lectularius*, has a long, well documented history of resistance to insecticides. Resistance is defined as "a heritable change in the sensitivity of a pest population that is reflected in the repeated failure of a product to achieve the expected level of control when used per the label recommendation for that pest species." Resistance is more common in populations with a quick generation time, such as house flies, German cockroaches, and bed bugs. It is less common in social insects such as ants and termites.

In general, pests have three approaches toward overcoming exposure to insecticides:

- **Metabolic detoxification by multistep enzyme systems** is a common method used to detoxify chemicals inside insect bodies, and there are many ways these processes can affect pesticides.

- Some insects — and bed bugs in particular — **have thickened their outer exoskeletons or cuticles** as a defense against chemical treatments.

- In some cases, pests change their behavior to avoid being harmed by pesticides.

**Behavioral resistance** is not believed to be affected by the same selection pressures as the first two types, and is the most difficult type of resistance to anticipate in integrated pest management (IPM) programs.

## WHAT'S A PMP TO DO?

Once a pest population is resistant, the mode of action, or how the pesticide controls the pest, is less effective (and in some cases, completely ineffective). Generally, acceptable control cannot be easily reached if the same pesticide continues to be used, even at higher concentrations.

Development of resistance to a specific chemical can be reduced by rotating products — and not just chemicals, but functional groups and modes of action. However, to significantly slow down the development of resistance compared to rotation, PMPs should use a combination of pesticides at the same time. These mixtures work well because as pests are treated with a potentially lethal dose of pesticide A, they are simultaneously affected by pesticide B. Only the very rare pests that have mechanisms of resistance to *both* products can survive and reproduce.

Control Solutions Inc.'s (CSI's) strategy of Combination Chemistry — the formulating of products with multiple active ingredients that have different modes of action, thus creating a unique product — was introduced to combat growing resistance. CSI is committed to continuing to work with researchers and industry professionals to address ongoing and developing pest problems.



DR. REED is technical services manager for pest control operators for Control Solutions Inc. (CSI), a member of the ADAMA Group. She may be reached at [janis.reed@controlsolutionsinc.com](mailto:janis.reed@controlsolutionsinc.com).





# Cruise Control

Bob Clements, Rick Lewis and Jim Warneke are putting their combined 150 years of pest management experience to good use on the high seas.

BY JERRY MIX Editor-at-Large

If a pest problem is discovered on a cruise ship, rest assured the ship's pest management team will move rapidly to solve the problem. And that's exactly as it should be. After all, neither the crew nor passengers want to see bed bugs in their cabin or watch a German cockroach dance across the salad bar during dinner.

Integrated pest management (IPM) is the course most plotted by cruise ships, especially those enlisting the expertise of pest management industry consultants. *Pest Management Professional (PMP)* caught up with longtime pest controllers Bob Clements, Rick Lewis and Jim Warneke, who together work on approximately 60 cruise ships a year that set sail from cruise ports around the world.

"Doing pest management on ships is a unique situation," says Lewis. "They can have every single problem we have experienced on land, except that on cruise ships the problems can intensify rapidly because of the small spaces and confined environments.

Because crew members are trained to report pest problems to their supervisors, bed bugs often are detected quickly.





"The people we work with are aware of this and they aggressively handle pest situations. So they make the whole thing a proactive approach rather than a reactive approach," Lewis continues. "What we do on land translates to the ships, except it is a bit more intense."

Warneke, owner of St. Cloud, Fla.-based JSW Pest Management Services, notes that "IPM on the cruise ships is true IPM. It's not like at a landside restaurant. For the most part, I would feel more comfortable eating in a cruise ship garbage room than in some landside restaurants. It's unbelievable the IPM and dedication that cruise ships have toward sanitation and pests."

Clements explains that he, Lewis and Warneke provide a basic IPM program for the staff that includes the ship's waiters, cleaners and deck hands. "We are not asking them to do additional work, we just want their eyes," says Clements, owner of SciEdServices, Leesburg, Fla. "We want them to tell us what they see."

"Some of these ships are huge, they might have 2,800 crew members. That's 2,800 sets of eyes out there," Clements continues. "We want them to report back what they see to their supervisor. In that way, we can get information back to control rapidly."

### 'YES, WE HAVE BED BUGS'

German cockroaches, house flies, fruit flies and rodents can all be part of the pest problem on cruise ships, but bed bugs are a special focus.

"Yes, we have bed bugs," Warneke admits. But he qualifies the situation, noting approximately 0.05 percent of the rooms on the cruise ships he

works on might have bed bugs in a year's time. It's because cruise ships are aggressive about taking care of the problem as swiftly as it is discovered.

"Cruise ships attack them. One bed bug is too many," reports Clements, noting word-of-mouth reputation can make or break a cruise line. "But most of the bed bug infestations are not heavy infestations like you often find in hotels, because the housing staff has been alerted to it and they report it."

### 7 BED BUG INDICATORS

Clements says cruise ships take note of seven specific bed bug indicators for a possible infestation. "If they find one of these indicators, they do a complete inspection of the entire area," he explains. The indicators are:

**1 ODOR.** "Bed bugs have a distinctive odor," Clements says. "But you usually don't find this on a cruise ship because the air conditioning is on all the time. You have to go up to the bed and sniff. If it smells like copper, that's blood."

**2 BITE PATTERN.** "You have a definite bite pattern for bed bugs," Clements says. "We show the crew what the bite pattern for bed bugs is, and then we also show them what are *not* bed bug bite patterns, like for fleas, fire ants or mosquitoes. For bed bugs, it's usually multiple bites on the neck, back or side."

**3 BLOOD SPOTS.** Clements says checking bedding and furniture upholstery for small brown spots of dried blood is a routine part of a room cleaning.

From left are Jim Warneke, Rick Lewis and Bob Clements.

## Three industry stalwarts

Among the three of them, Bob Clements, Rick Lewis and Jim Warneke have approximately 150 years of professional pest management experience.

Warneke was with the pest management team of Disney World for a number of years, while Lewis worked as an industry supplier representative. Clements was part of his family's pest management company, Clements Pest Control, in Leesburg, Fla.

"We get together at least once a year and talk about where we want to go and what we want to do," Warneke says, noting cruise ship work offers them the rewarding experience of keeping the premises pest-free, as well as the opportunity to be passengers and travel worldwide.

The trio agree that none of their cruise ship work would have been possible without the pioneering work done by Florida pest professional Phil Van Dam. "What we are doing today is an expansion of what Phil started many years ago," Clements says.

When Van Dam started servicing cruise ships in the early 1970s, one of the cruise ship lines had just three ships, whereas today it has more than 100. Clements notes the industry will likely continue to grow. — J.M.







**4 CAST SKINS.** "These can be in the bed or along the baseboards," Clements says, noting that typically, the fragile skins are less than 1-in. long. "If the cleaners see something like this, they are instructed to stop vacuuming and call their supervisor to make sure what it is. They then call the PMP."

**5 FECAL MATERIAL.** "This looks like pepper or poppy seeds," Clements says.

**6 EGGS.** "They look like little grains of rice," Clements says.

**7 NYMPHS AND ADULTS.** Inspections will reveal that part of the problem, but usually one or more of the other indicators are already present by the time these life stages are discovered, Clements says.

## TREATMENT BEGINS

After actually identifying the bed bugs, several steps are taken. Of top priority are the affected passengers.

"If there is a bed bug problem, they move the

***"What we do on land translates to the ships, except that it is a little bit more intense."***

— RICK LEWIS

passengers to a clean room and then treat the problem room," Warneke says. "That is followed by a very thorough inspection program."

Next, all of the soft goods like sheets, pillows, blankets, drapes and shower curtains are given to the laundry team, where they are washed in water that is at least 140°F. The items are then dried at the same temperature. Using 140°F as a guide will kill a bed bug in approximately 10 minutes, Clements says.

Portable hair dryers can reach more than 150°F, and they can be used to treat luggage. "Put the luggage in a plastic bag and heat it up," Clements says. "Nothing comes out of the room that is not

sealed in a plastic bag. Nothing gets put on the deck.

"Then they check the bed," he continues. "They inspect every tuft on the mattress. They take the bed apart and check the entire frame. Also, they check all of



## No passage for other pests, either

Jim Warneke reports that unlike the "red-alert" level of a bed bug infestation, other pest issues are fairly benign on cruise ships thanks typically to high levels of sanitation from stern to stern. That's not to say they are always pest-free, however.

"Depending on what ports we go into, there are fly concerns when we are in port," Warneke offers as an example. "But when the ship leaves, the flies usually are blown off the ship."

Rick Lewis says fruit flies are a hardy pest on cruise ships. "I seem to encounter more issues with fruit flies than with bed bugs," he admits, noting that keeping drains and drain lines clean usually solves the problem.

Clements says the primary cockroach found on cruise ships is the German species — usually brought in with passenger luggage. There also is an occasional rodent problem, which the team solves partly with a strategy used during the Black Plague of the mid-14<sup>th</sup> century: spring-loaded, round guards that go over the ship's mooring lines so a rat or mouse cannot pass.

Bob Clements points his flashlight at a sink that needs sanitation attention.





Rick Lewis owns  
Lewis Consulting,  
based in Tampa, Fla.

the furniture in the room. The floor is vacuumed two times in opposite directions and then the bag is taken off the vacuum and thrown into the incinerator.”

Clements says that essentially, the cabin is taken apart and then

put back together. They even remove the wall coverings and electrical coverings.

After a pesticide treatment, Clements says, the team returns in seven days to reinspect the cabin: “Then they do the same thing after 14 days, because bed bug eggs will hatch within seven to 14 days.

“You are never going to stop bed bugs from coming, but you can stop them when they get there,” Clements continues, noting that bed bug infestations are typically limited to four or five a year, per ship. He says part of that is due to the diligence of cleaning teams and their ability to catch the seven indicators early on, and part is due to the effectiveness of many of the bed bug control products currently available to professionals.

All of this IPM work is subject to regulations set by the Public Health Service. Once the ships come out of international waters and into United States’ waters, they are subject to inspection. As part

**“It’s unbelievable the IPM and dedication cruise ships have toward sanitation and pests.”**

— JIM WARNEKE



of this program, the cruise ships compile logs detailing the pests that have been found, for example, and then the work that has been performed to control them.

“For the passengers and the crew, they are part of cities — entire cities floating on water. It’s a completely different world,” Clements concludes. **PMP**

MIX is a member of the PMP Hall of Fame, Class of 2005. He may be reached at [mpeditor@northcoastmedianet](mailto:mpeditor@northcoastmedianet).



Crew members  
prepare to  
reattach a  
headboard  
after a bed bug  
inspection.





# Bed bug management tips from PMPs

Pest management professionals who regularly battle bed bugs share strategies that work for them.

BY DIANE SOFRANEC | Managing Editor

#### MORE ONLINE

For additional bed bug management tips, visit [PMPestTalk.net](http://PMPestTalk.net).

**IDENTIFY THE PEST.** "Proper identification starts with a thorough inspection of anywhere the client spends most of their time. We then take samples to be examined under our microscopes for a positive ID of bed bugs. We also use LED flashlights and monitors. These tools, along with our normal inspection protocol and treatment rotation, allow us to keep ahead of the bed bug situations within our accounts."

— Robert Szczech, assistant general manager and Cleveland branch manager, Central Exterminating Co.

**BE THOROUGH.** "We have found bed bugs in places you wouldn't think. Don't leave any stone unturned. Only use your gloves to contact infested areas if you can help it, and check yourself before entering your service vehicle. The last thing you need to do is bring bed bugs home or back to the office."

— Jerad Larkins, owner, All In One Pest Home and Lawn, Jolo, Kan.

#### EDUCATE THE CUSTOMER.

"When you are dealing with bed bugs, you really have to get the customer to understand they are partners with you in eliminating the problem. So much of the effectiveness of the treatment is dependent on the customer making the right preparations and following direction from the PMP. In the process of educating the customer, it is a fine line you tread in getting them to understand the gravity of a bed bug infestation without scaring them."

— Jacob Haslem, owner/operator, ActivePro Pest Control, Hurricane, Utah

#### SHOW COMPASSION.

Listen to customers' thoughts and concerns. Sympathize with your customers. Don't say they have an infestation, and reassure them it can happen to anyone. Don't judge the mess, if there is one. Follow up after treatment. People like to know you care."

— Christina Eaton, account manager, Rose Pest Solutions, Troy, Mich.

#### SUGGEST HELP WHEN NECESSARY.

"Bed bugs have a huge psychological effect on some people, and we have informed clients to seek professional psychological help in dealing with them. Our clients' concerns are understandable, because anyone who has performed numerous ectoparasite treatments would be lying if they didn't feel like the ectoparasites were crawling on their skin after they physically were. It is a fine line we leave up to our sales team to discern, because of how each client appears to deal psychologically with their infestations."

— Mark Giordano, president, Scientific Exterminating Services, Saint James, N.Y.

#### MAKE PREP A REQUIREMENT.

"Customers have to sign a prep sheet, along with the service agreement, that details what must be done. We will not treat for bed bugs unless they prepared properly."

— Roger Burgess, president, Burco Services, Atlanta

#### HELP CUSTOMERS UNDERSTAND.

"In addition to our preparation checklist, we have a preparation video. Customers can go to our website and watch that video, which walks them through all the things they need to address. People who don't know how to read can watch the video. Regardless of whether they can read or speak English, nobody wants to live with bed bugs."

— Brent Roberts, owner, Custom Bedbug Inc., Eagle, Idaho

#### TELL CUSTOMERS WHAT TO EXPECT.

"Don't promise customers they will not see bed bugs after you're done with treatment. Give them realistic expectations."

— Dorell Bush, president, Bush Termite and Pest Control, Edwardsville, Ill.

#### DON'T EXPLAIN THE LEVEL OF ACTIVITY.

"I do not quantify the level of infestation to the client; they either have bed bugs or they don't. I made the mistake once of telling a customer, before the inspection was complete, that his bed bug



problem was minimal. The third bedroom, 'which no one slept in,' was a disaster. We stopped counting at 100-plus bed bugs and dozens upon dozens of eggs on the bed frame, nightstands and on the frame of a large painting hanging above the bed. Our credibility took a hit. Now, I feel more comfortable with confirming 'yes' or 'no' regarding bed bugs; it makes pricing and future expectations much easier to explain and justify."

— Jim Contreras, president, Professional Pest Control, Ravensdale, Wash.

#### GET A SIGNED CONTRACT.

"A corporate attorney should review your contracts. Bed bug contracts need to spell out everything for the customer, including prep if applicable, what is expected of the customer and management, if applicable, and what the customer should expect from the PMP. We will not schedule any type of service without a signed agreement and a credit card on file."

— Joseph Sheehan, president, Colony Pest Management Inc., Brooklyn, N.Y.

#### EVALUATE NEW PRODUCTS AND EQUIPMENT.

"We learn about the new products and equipment developed for bed bug management through articles in PMP magazine, and product distributors and manufacturers. We hold mandatory meetings in our office to make sure we have all the current information. A few times a year, we meet at a customer's location for hands-on training in the actual environment where we would be using the new product or equipment."

— Michael Garrison, director of operations, Owl Pest Prevention, Hyattsville, Md.

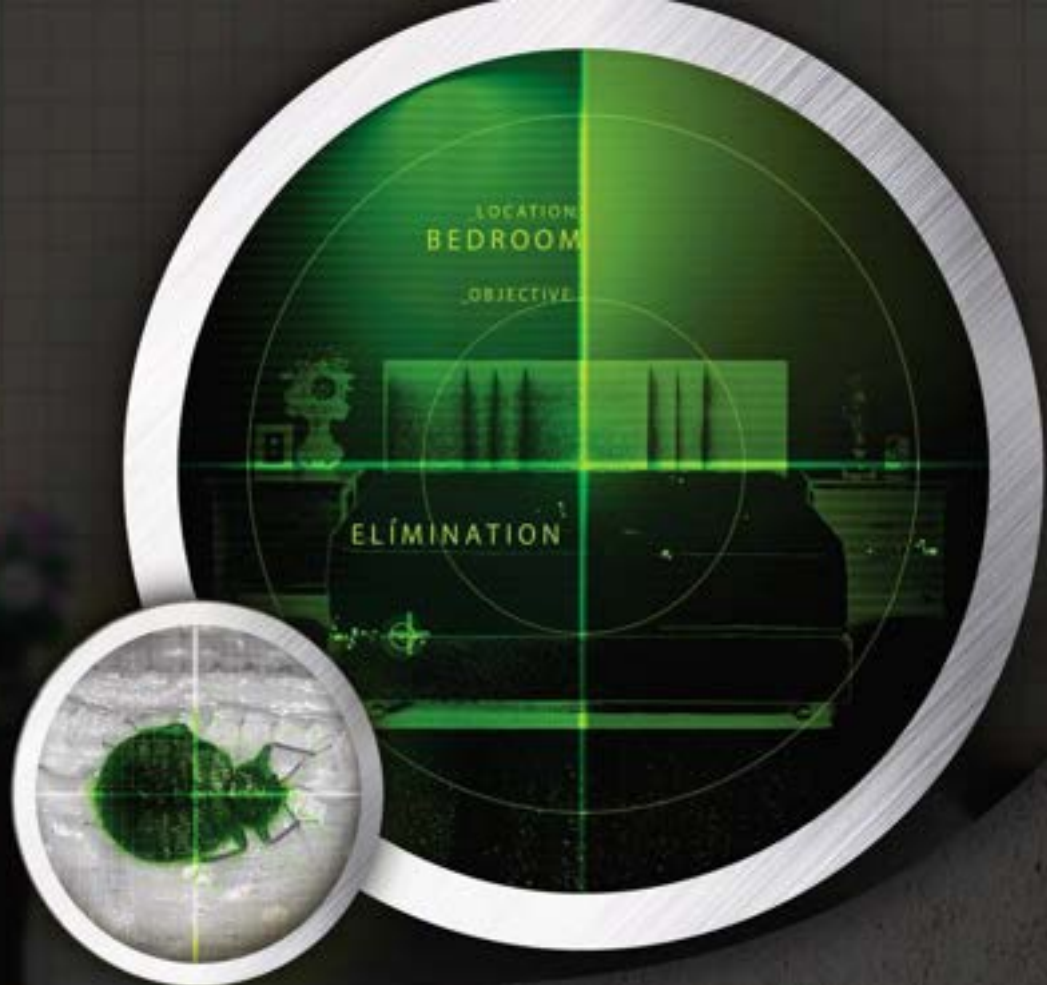
#### PROVIDE ONGOING TRAINING.

"We hold monthly training meetings with our service and sales teams. We also have weekly individual training sessions with our employees. In addition, we have an annual training day for the entire company. This allows us to give individualized training based on the needs of the employee, yet still get a group dynamic to ensure the training message is consistent across all teams."

— Patrick Boland, ACE, technical director, Scherzinger Pest Control, Cincinnati







**\_TARGET SITED:  
BED BUGS**

**\_SOLUTION:  
STRYKER®  
Insecticide Concentrate**

## MISSION BRIEF:

### \_APPLICATION AREAS:

MATTRESS SEAMS	NIGHT STANDS
MATTRESS EDGES	CARPET EDGES
MATTRESS TUFTS	HIGH AND LOW MOLDINGS
BED FRAME	WALL VOIDS
BOX SPRINGS	BEHIND WALL HANGINGS
INSIDE EMPTY DRAWERS	WALLPAPER
CLOTHES CLOSETS	
CRACKS AND CREVICES	

### \_APPLICATOR:



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\*Read and follow all directions on the container label for rate, timing and application sites.





# Big business

Three-quarters of pest management professionals expect their bed bug-related revenue to continue to rise, according to *PMP's* 2017 Bed Bug Management Survey.

BY **MARTY WHITFORD** | Editorial Director & Publisher

**B**altimore — site of the National Pest Management Association's (NPMA's) upcoming PestWorld 2017 — welcomes about 25 million visitors annually. Dubbed "Charm City," Baltimore serves as the home port of several cruise ships and is quite a business-meeting hub, being located just 40 miles from the nation's capital. The city also apparently is a big draw for *Cimex lectularius*, the common bed bug. Orkin's latest Top 50 Bed Bug Cities list, released in January, ranked Baltimore No. 1.

"I'm not surprised Baltimore moved up nine slots in the rankings," says Bob Johnson, Orkin entomologist and Northeast technical services manager. "The annual ranking is based on our number of new jobs, and our phones are ringing off the hook here with bed bug calls."

Orkin isn't alone. Three-quarters of the 213 professionals completing *Pest Management Professional's* (PMP's) 2017 Bed Bug Management Survey report they expect their bed bug-related revenue to continue to rise in 2017 and beyond. Many pest management professionals (PMPs) maintain that bed bugs are scary good at adapting and overcoming challenges.

"These crafty critters are developing thicker cuticles and processing toxicants faster," Johnson notes. "Meanwhile, education of, and cooperation from, the public continues to be an issue. Our nation's bed bug problem will get a lot worse before it gets better. The bed bugs are running the marathon — while far too many do-it-yourselfers are walking it."

#### BLOOD MONEY

"What termites were in the '70s and '80s, bed bugs are today," Orkin's Johnson says.

According to Specialty Consultants' latest research — *A Strategic Analysis of the U.S. Structural Pest Control Industry* — professionals' service revenue derived from controlling bed bugs in the U.S. increased 6.6 percent in 2016, reaching \$611.2 million.

"We estimate 907,875 bed bug jobs were completed in the U.S. in 2016," says Gary Curl, Specialty Consultants' founder and president. "This marks an 11.4 percent increase from the estimated 815,000 jobs completed in 2015."

"In the Midwest, bed bugs were the second-highest revenue-generating pest for professionals," Curl adds. "If this trend continues, I won't be surprised to see the industry by 2020 generating \$1 billion in service annually from controlling bed bugs alone."



**BOB JOHNSON**





Seeing big business potential early, Milwaukee-based Batzner Pest Control set up a Bed Bug Services division in 2009. Paul Matusiak, the division's service manager, says the unit expects to record more than \$2.5 million in revenue this year. Batzner's Bed Bug Services division comprises eight technicians, four bed bug-scent detecting beagles (Lucy, Simon, Roxy and Benji), and four K9 handlers. About 70 percent of the unit's revenue stems from the commercial sector, including apartment complexes, hotels, hospitals, call centers and similar accounts.

"We still run into tenants and homeowners who have battled bed bug problems for years," Matusiak says. "Most of them know they have bed bugs. They just don't know what they don't know. Too many are still trying do-it-yourself treatments years later."

Joe Summers, owner of Cypress, Texas-based Coastal Pest Management, also sees big business managing these parasitic pests. Summers expects bed bug inspections and treatments to generate at least 10 percent of his company's 2017 revenue.

"A lot of our first-time calls stem from bed bug infestations," Summers says. "Our industry's bed bug management revenue growth is not over, not by a long shot."

#### GPC FEEDERS

Cook's Pest Control turns bed bug problems into general pest control (GPC) contracts, says Stephen Gates, vice president of technical services for the Decatur, Ala.-based firm.



STEPHEN GATES

"We typically don't sell standalone bed bug jobs," Gates says. "Usually, they're either a GPC client, or they will be soon. We want all of our customers to know

Cook's stands behind them, against all structural pests."

Gates predicts high-rise apartments will suffer the most severe bed bug infestations for the foreseeable future.

"It's often easier for hotel managers, than it is for apartment managers, to identify and corral bed bug problems. Typically, hotel guests haven't been there for weeks, never mind years," Gates says. "By contrast, it's not uncommon for us to receive calls from managers of large apartment buildings that have tenants who have knowingly suffered horrid bed bug infestations for years, and the property managers are just now discovering it."

For one severely infested apartment unit, Cook's deployed a team of three bed bug techs to conduct weekly inspections and treatments, using liquid concentrate pesticides and some dust. It took two months to control the infestation.

Cook's saved a mattress and box spring, using encasements, but some furniture had to be discarded and the unit had to be recarpeted.

"The tenant, a grandmother, had thousands of bed bugs as roommates," Gates adds. "We also had to treat her daughter's house weekly for one month due to hitchhiking bed bugs and numerous reintroductions."



JOE SUMMERS

#### TINY TIME BOMBS

Chris Komarow, a senior tech with Lancaster, Pa.-based Dominion Pest Control, had one bed bug job in 1998.

"What a difference 20 years makes!" he says. "We typically tackle two or three bed bug jobs every week now."

Komarow's worst war story?

"These tenants were bombing for cockroaches, but they had bed bugs also, and the bombs had spread them everywhere," Komarow recalls. "There were thousands of the little bloodsuckers, covering all stages of development, multiple generations.

"We were fighting two wars — one against cockroaches and one against bed bugs — simultaneously," Komarow adds. "It's rather distracting when you're treating a couch for bed bugs and all these German cockroaches come pouring out."

Three years ago, Komarow and company established a proactive bed bug management program. Branded "Dominion's Pre-emptive Strike," the program includes regular, proactive monitoring and inspections, and targeted preventive pesticide and insect growth regulator (IGR) applications.

"By getting ahead of these 'tiny time bombs,' we save clients blood, money and sleep," Komarow quips.

Batzner's Matusiak agrees with taking a proactive stance.

"We're trying to steer the conversation to



CHRIS KOMAROW



PAUL MATUSIAK





our clients truly teaming with us and becoming more proactive in the fight against bed bugs," he says. "It's not an easy talk to have with many property managers. Many — due to limited time, staff and money — are focused

on putting out big blazes, not on looking for signs of small fires."

Christian Wilcox, technical director for McCauley Services, reports that since 2009,

the Bryant, Ark.-based company has boosted its number of bed bugs jobs more than 300 percent — and related annual revenue more than 500 percent. Its bed bug control arsenal includes pesticides, dusts, select heat treatments, and customer education and cooperation.

"In 2009, we fielded one to two bed bug jobs per month, each typically paying \$1,000 to \$2,000," Wilcox says. "Last year, we tackled one to two bed bug jobs per week, typically for \$1,500 to \$3,000 per job.

"I see the bed bug outbreak continuing to spread," he adds, "but I'm hopeful more infestations will be slight to moderate — instead of severe — as public awareness and customer cooperation improve, and more consumers call on professionals a lot earlier."

## PERSISTENT PESTS

This reporter felt compelled to call one more bed bug survey respondent, the owner of Bug Busters in Lacey, Wash. How could one pass on the opportunity to speak with Steve Rogers? After all, he could be Captain America.

Reaching Rogers' voicemail only confirmed this was a must-land

interview: "Sorry I can't come to the phone right now. I'm probably in the middle of talking to someone about a *bed bug* infestation."

In 2005, Bug Busters performed eight bed bug treatments totaling about \$2,000 in revenue. Last year, the company inspected and/or treated more than 1,000 units for bed bugs. Rogers says the cryptic creatures now account for one-third of his firm's annual revenue.

Despite the super-surge in work, Rogers says Bug Busters had zero callbacks on bed bug jobs each of the past three years. He credits the feat to thorough training, effective control tools and techniques, and customer cooperation. (Bug Busters makes each client sign "A Promise to Cooperate" contract.)

"One of our competitors actually was pleased when its new bed bug jobs outnumbered its bed bug-related lawsuits,"

Rogers adds. "We've been in business more than 30 years, and we've never been sued. If we do it, we do it right."

How does one land an interview with Captain America? One keeps calling, and perhaps once forgets the three-hour time difference — that 9 a.m. in Cleveland is 6 a.m. in Washington State. (Sorry, Captain America!)

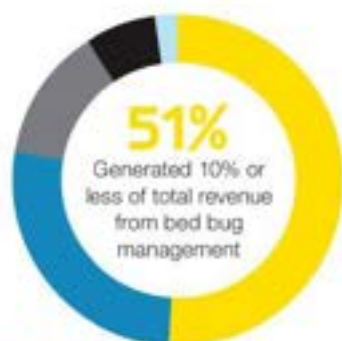
"You're as tenacious as the bed bugs," Rogers greeted me when answering my final call.

"Thanks, I think," I replied. "But we both know they'll be around long after I'm gone." PMP

You can reach WHITFORD at [mwhitford@northcoastmedianet](mailto:mwhitford@northcoastmedianet) or 216-706-3766.

# Bed Bug

## Percent of Total 2016 Revenue Generated By Bed Bug Management



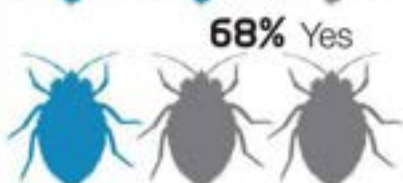
**27%** Generated 11% to 20% of total revenue from bed bug management

**13%** Generated 21% to 30% of total revenue from bed bug management

**7%** Generated 31% to 50% of total revenue from bed bug management

**2%** Generated more than 50% of total revenue from bed bug management

## Do you differentiate bed bug job pricing based on infestation severity?





# Management Survey

SOURCE: PMP ONLINE  
SURVEY WITH  
213 RESPONDENTS

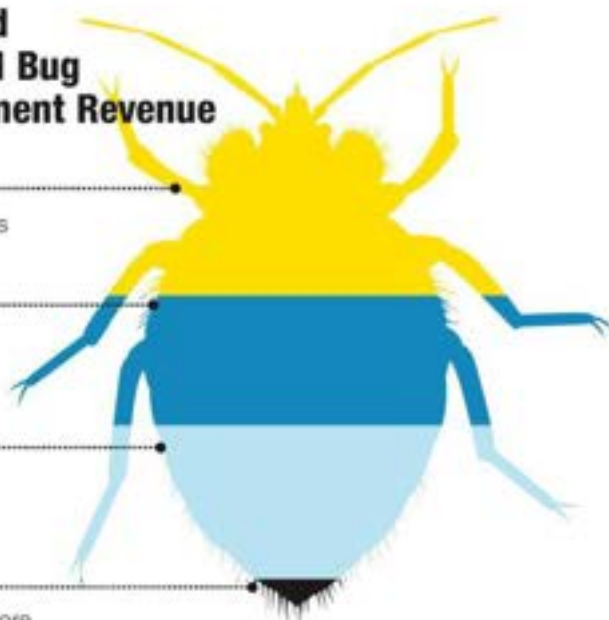
## Projected 2017 Bed Bug Management Revenue

**48%**

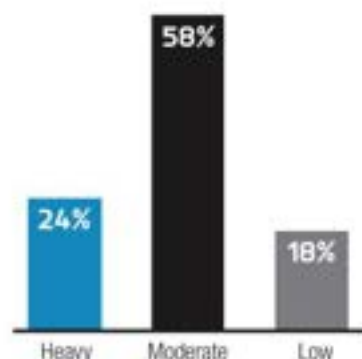
\$49,999 or less

**22%**\$50,000 to  
\$99,999**26%**\$100,000 to  
\$999,999**4%**

\$1 million or more

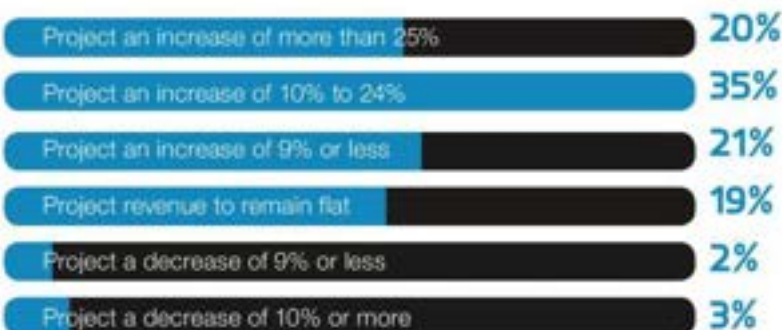


## Bed Bug Pressure



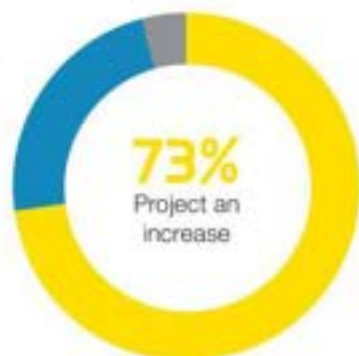
## Bed Bug Management Revenue —

2017 Projections vs. 2016 Actuals



## Number of Bed Bug Jobs —

2017 Projections vs. 2016 Actuals

**23%** Project their number of  
bed bug jobs to be flat**4%** Project a decrease

## Do you include mattress and/or box spring encasements as part of your comprehensive bed bug management program?

**55%** Yes**45%** No

## Which types of bed bug jobs typically cost the most?

**66%** Single-family  
homes**27%** Apartments/  
Condominiums**7%** Hotels





## WHAT DO YOU CHARGE TO TREAT ...

A single-bedroom apartment/condo involving a severe bed bug infestation?

A severe bed bug infestation spread across several apartments/condos (per unit)?

A severe bed bug infestation spread across several hotel rooms (per unit)?

\$299 or less	8%	10%	27%
\$300 to \$599	32%	31%	33%
\$600 to \$899	35%	29%	22%
\$900 to \$1,199	15%	15%	10%
\$1,200 or more	10%	15%	8%



Do you offer ongoing bed bug monitoring services?



Do you offer preventive bed bug inspection services?

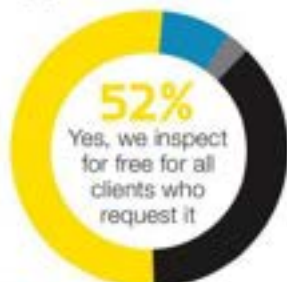


### Resident Liabilities

One-third of PMPs say they believe most bed bug-related lawsuits and claims are the fault of uncooperative residents of infested dwellings



Do you offer current clients *free* bed bug inspections?

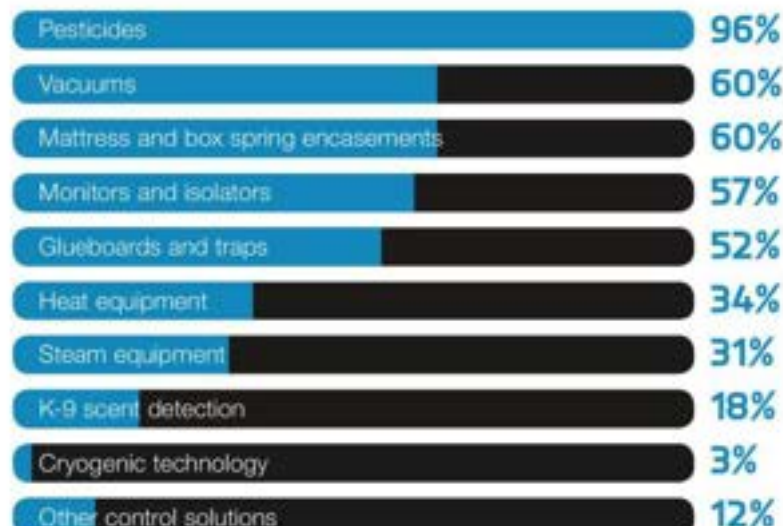


**8%** Yes, but only for annual general pest control customers

**3%** Yes, but only for accounts that have had bed bug infestations

**37%** No

Which bed bug management tools do you use?



LOCATION  
BEDROOM

OBJECTIVE  
ELIMINATION



TARGET SITED:  
**BED BUGS**

SOLUTION:  
**VECTOR-BAN PLUS**  
Multi-Purpose Insecticide

## MISSION BRIEF:

### APPLICATION AREAS:

MATTRESS TAIL SURFACES - LOOSELY TIED  
BED FRAME  
BASEBOARD  
MOLDING  
FLOOR



### APPLICATOR:



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\*Read and follow all directions on the container label for rate, timing and application sites.





**TARGET SITED:  
BED BUGS**

**SOLUTION:  
CYZMIC<sup>®</sup>CS**  
Controlled Release Insecticide

## MISSION BRIEF:

### APPLICATION AREAS:

CRACKS AND CREVICES  
BASEBOARDS  
LOOSE PLASTER  
BED FRAME  
BOX SPRINGS  
FURNITURE




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