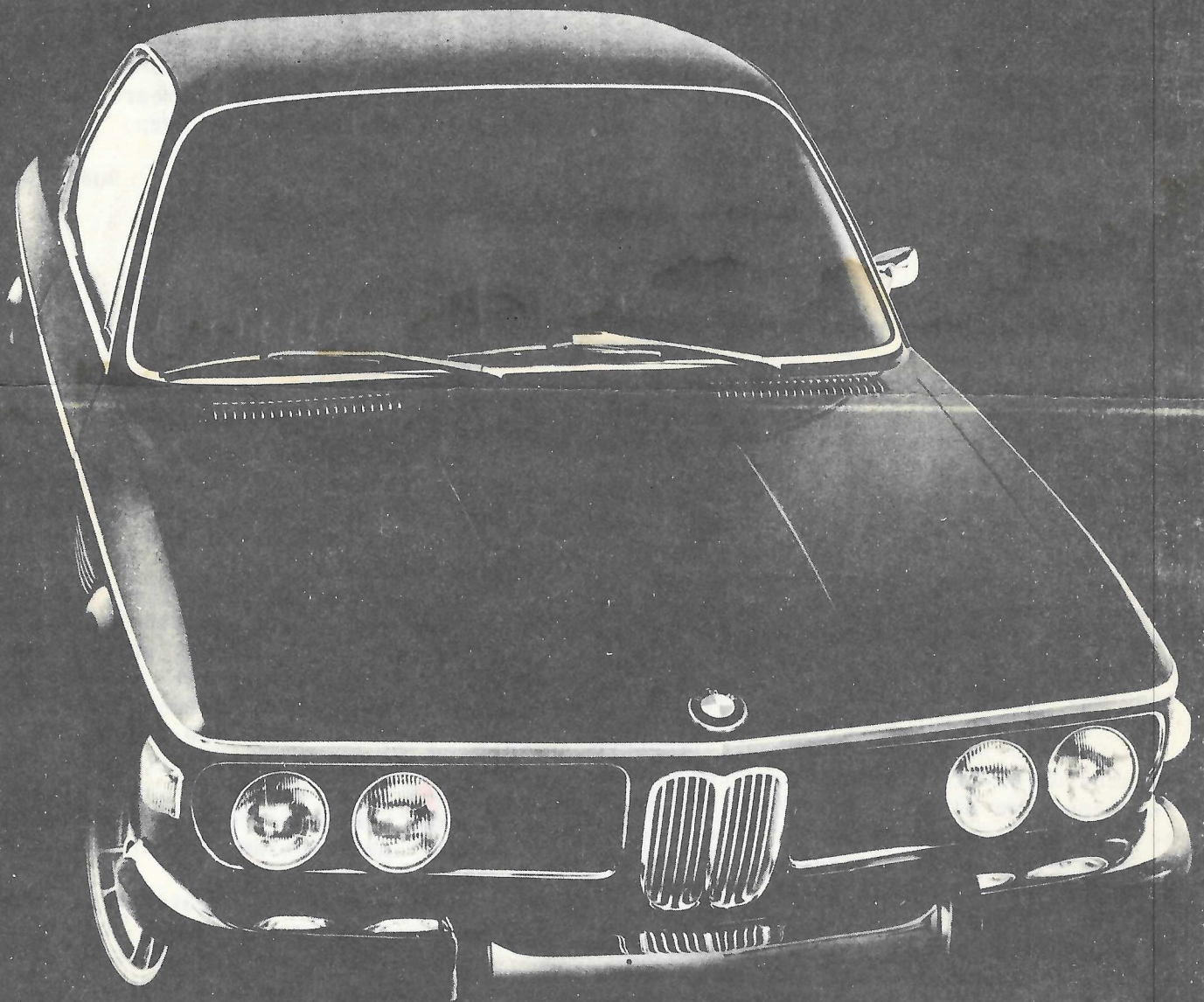




das Krummet

VOLUME III No. 1 CIRCULATION 150 JANUARY 1973



Everything You Always Wanted

To Know About Swaybars,...

PRESIDENT'S COLUMN

Well I guess we all survived the Christmas Party at the Cottrell's. It was a fine bash and any of you who missed it should be kicking yourselves. Dave and Mary did a fantastic job and we thank them.

There are many things on my mind right now but first and foremost is gratitude (mixed with a touch of awe) for the person whose shoes I am to fill this year, Jim Craig. A true phenomenon when it comes to knowledge of BMW's he's also just a plain nice guy. I'm proud to be able to call him friend and glad that he will be readily available as Activities Chairman to help guide our club in its third year. As a testimate to his unbelievable level of activity for the club Jim took the First Annual Participation Trophy by a landslide - nobody else even came close! Rose Marie Sundstrom garnered the Ladies Participation Trophy and she wasn't even here for the last three months of the year!

I am very happy to have Mary Cottrell still on the board as our new Vice President. She has probably put in more plain hard work as last year's Treasurer, Oktoberfest Banquet Chairwomen (chairperson?), and hostess of our Christmas Bash than anyone realizes. Whenever something needs to be done Mary is right there to do it.

Another Mary, of the Vack variety, is now on board as our new Secretary. Mary has been a kind of pseudo - officer as the wife of our newsletter editor must be, and needless to say she will brighten up the "HEAD TABLE" at our club meetings.

Our man with the checkbook is Dave Pritchard, newly elected Treasurer. Dave has been one of the steadiest and most active members of our club, he's such a quiet guy we sometimes forget all he has done for us. I can't think of a better man for the job.

Two more people who deserve thanks are Katy Stanberry and Vic Shunkwiler. Katy put in a fine three months as Secretary filling in for Rose Marie Sundstrom. Vic, our outgoing Activities Chairman will nevertheless still be around to add his own kind of vigor to the club. He is probably the best autocrosser we have; he placed third overall in the SEVSCO Championship Event, behind a Mini-Cooper and an

MGB with race tires and I'm looking forward to his help and advice this year.

Finally, Pete Vack will continue his work on Das Kummet, his agonies much relieved by Sandra Craig, who now does the typing. (ed)

Well thats a quick rundown on who you can blame things on this year. I think it's a pretty good bunch of people and we have a promising year facing us. This will be our first full year as SEVSCO members and we will be putting on four SEVSCO authorized autocrosses. We will need OD's for these events not to mention helpers. Using the survey in the last das Kummet as a guide we are going to make a real effort to reach all our members this year with a greater variety of activities. I'm looking forward to 1973 as a year of growth in numbers and enthusiasm for the Bey Em Vey Corp.

Rusty Barton

MINUTES

The November 21st meeting was called to order at 7:40 pm. Mary Cottrell reported a balance of \$200.04.

Vic Shunkwiler gave the activities report. Four teams and an alternate were chosen or volunteered to represent our club in the SEVSCO Yearly Championship Points Event for Clubs.

It was decided that first time national members would pay \$15.00 for local and national dues; since it is required that starting January 1st all Bey Em Vey members also become National BMWCCA members. National dues are \$10.00 for first year, \$5.00 each subsequent year. Bey Em Vey dues are \$10.00 a year. Dues are collected next year from January to March.

The subscription for the newsletter is \$7.00.

The rest of the meeting was taken up by nominations of next years officers.

The meeting was adjourned at 8:40 pm.

Attending members drew for door prizes.

A movie of the East African Safari Rally was shown.

Afterwards everyone met at the Village Inn Pizza Parlor.

Katy Stanberry

ACTIVITIES

Greetings from your new Activities Chairperson. If at all possible 1973 will be an active year. To get things rolling I need four volunteers to form the Activities Committee. Two of these lucky people will be responsible for an activity in February and the other two will be working on the March activity. If you want to help, call me. If no one calls me by the 16th I'll choose who I want - so you're forewarned here and now. If you would like a certain type of event - call me. If you want to know when or where an event will be occurring - call me. That's my job and I'm going to be on top of all area events - all the time.

UPCOMING EVENTS

<u>Date</u>	<u>Event</u>	<u>Club</u>	<u>Location</u>
Jan 7	Auto-X	Tidewater SCC	Janaf
14	Auto-X	Beach Ford MC	Unknown - Call me
16	Meeting	BMW Club	Janaf
21	Tech Session	BMW Club	Lynhaven Motor Co.
21	Auto-X	Peninsula SCC	Montgomery Wards-Hampton
28	Rally	Andiamo	Unknown - Call me
Feb 4	Auto-X	Tidewater Assoc. of Classic Healeys	Unknown - Call me
11	Rally	Peninsula SCC	Unknown - Call me
18	Auto-X	BMW Club	Not firm yet
20	Meeting	BMW Club	Janaf
25	Auto-X	Andiamo	Mercury Mall - Hampton

Jim Craig
488-6843

TECH SESSION:

The first tech session of '73 will be held at noon on January 21st. The location will be Lynhaven Motor Co. At 3711 Bonney Road in Virginia Beach. This is near the intersection of Rosemont Road and Virginia Beach Blvd.


In addition to lifts, a steam cleaner and front end machine will be available. If you've been saving a big job, the 21st sounds like the time to tackle it. If you don't want to work on your car, come on out and learn something or just kibitz. Besides, it'll be warm inside.

Jim Craig

DUES ARE DUE

Yep, it's that time again. Membership dues are due for 1973. Please send your dues soon - to guarantee uninterrupted publication of das Kummel. We've just bought a typewriter, so funds are low. Thank you!


Local dues plus BMWCCA dues: \$15
Local dues for BMWCCA members: \$10
Newsletter subscription only: \$ 7



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A SWAY BAR PRIMER

Four cylinder BMWs are equipped with a 15 mm diameter front anti-sway bar and a 16 mm diameter bar on the rear. These sway bars are quite effective (take a ride in a 1600 or a '68 2002 if you doubt it), but still they're just not quite stiff enough for us ersatz racers. Ed Phillips' article last month shows how easily and inexpensively the suspension may be stiffened up. How stiff would you like it? Full bore competition or just slightly firmer? Hopefully this article will enable you to get exactly what you want.

The first concern is "how stiff". A BMW rides quite well and I doubt if you want it to end up riding like a dump truck. So we'll cover stiffness first. The torsional stiffness of the sway bar increases as the cross-sectional area of the sway bar increases. Increased torsional stiffness reduces body roll, increases cornering power, and unfortunately decreases the benefits of independent suspension (ride comfort and road holding on poor surfaces). Obviously some compromises will have to be made. The two tables below list the sway bar diameter and relative torsional stiffness for front and rear sway bars. The stock diameter is chosen as 100% for this comparison.

	Diameter	Relative Torsional Stiffness
Front	15 mm	100%
	19 mm	160%
	two 15 mm bars	200%
	22 mm	215%

Table 1

	Diameter	Relative Torsional Stiffness
Rear	16 mm	100%
	19 mm	141%
	22 mm	189%
	two 16 mm bars	200%

Table 2

As you can see a 19 mm bar (front or rear) provides about a 50% increase in stiffness. This is a good (and noticeable) increase with no penalty in either comfort or road holding. A 22 mm bar (front or rear) provides a still greater increase in stiffness. Unfortunately a 22 mm bar may prove unsatisfactory in some cases if your forte is bombing down secondary roads at extra legal velocities.

The next topic is "balance". Here the term "balance" means the ratio of front torsional stiffness to rear torsional stiffness. For this discussion we will neglect the effects of springs and shock absorbers on the effective torsional stiffness. In other words we'll assume they're constant and only look at the stiffness of the sway bars. Table 3, below, shows the "balance ratio" or "front-to-rear torsional stiffness ratio" for the more popular sway bar diameters and some of their possible combinations.

		Rear Sway Bar Diameter			
		16 mm	19 mm	22 mm	Two 16 mm bars
Front Sway Bar Diameter	15 mm	0.88	0.62	0.47	0.44
	19 mm	1.41	1.00	0.75	0.71
	two 15 mm bars	1.76	1.25	0.93	0.88
	22 mm	1.89	1.34	1.00	0.95

Table 3
Front/Rear Torsional Stiffness Ratio

"Great" you say, but what does this table mean? Look at the ratio for a 15 mm front bar and a 16 mm rear bar. The front-to-rear torsional stiffness ratio is 0.88. This means that the rear has more roll stiffness than the front. Why? The BMW is front engined and front weight biased and therefore tends to understeer. Increasing the rear roll stiffness over the front stiffness tunes a small amount of oversteer into the rear suspension which will tend to make the car neutral handling by compensating for the already prevalent understeer. Thus for ratios less than 0.88, the car's handling will be tending towards oversteer while for ratios greater than 0.88 the handling will be characterized by understeer (compared to the way the car handles with the stock suspension set-up). The lower the ratio the more

A SWAY BAR PRIMER CON'T

oversteer you'll have and the higher the ratio the more understeer.

The next table should help clarify this somewhat. Here we'll normalize the front-to-rear torsional stiffness ratio to 100% for the stock (15 mm/16 mm) sway bar combination. Hence, ratios less than 100% indicate a tendency to oversteer while ratios greater than 100% indicate understeer. The greater the difference between a given ratio and 100%, the more pronounced the handling characteristics will be. Therefore a ratio of 114% indicates a very slight bias towards understeer, whereas a ratio of 215% indicates severe understeering characteristics.

Front Sway Bar Diameter	Rear Sway Bar Diameter			
	16 mm	19 mm	22 mm	Two 16 mm bars
15 mm	100%	71%	53%	50%
19 mm	160%	114%	85%	80%
two 15 mm bars	200%	142%	106%	100%
22 mm	215%	152%	114%	108%

Table 4 - Balance

The tables above will now allow you to tailor the handling of your BMW by selection of antisway bars. First you must decide how much roll stiffness you want. Secondly you need to know how the car handles now (understeer, oversteer, neutral). Finally you must decide how you want the car to handle (understeer, oversteer, or neutral) when the job is done.

For example, let's say you've got a 2002 you want to set up for auto-crossing and you're not too concerned with ride comfort. You've already installed green (stiff) springs and Konis. With the stock 15 mm/16 mm sway bars the car understeers heavily when under moderate power and slightly under full power. You need as much roll stiffness as possible combined with a bias towards moderate power-on oversteer. Referring to Table 4 we see that there are only five combinations which will give us oversteer (ratios less than 100%). These are: a 15 mm front bar with either 19 mm, 22 mm, or two 16 mm rear sway bars; and, a 19 mm front bar with either a 22 mm or two 16 mm rear sway bars. To prevent any abrupt transition

from understeer to oversteer the ratio should only be slightly less than 100%. A ratio of 50% might give the desired amount of oversteer, but the car could lose its predictability and become virtually undrivable as a result of the abrupt weight transfer caused by the large rear bar(s). That leaves three choices: 15 mm/19 mm; 19 mm/22 mm; and 19 mm/two 16 mm. The 15 mm/19 mm combination can be eliminated on the basis of inadequate stiffness (see Tables 1 and 2). Either of the other two possibilities should be satisfactory and provide predictable oversteer combined with improved roll stiffness.

Let's say you had settled on the 19 mm front bar with two 16 mm bars in the rear. At a later date after modifications have been made (cut springs, racing tires, wider wheels, etc.) the car's handling has been altered. Assume the car now does not have sufficient oversteer. Referring back to Table 4 you can see that without reducing the front roll stiffness (reducing the size of the front bar) there's no apparent way to increase oversteer (reduce the "Balance" below 80%). Assuming that you don't want to reduce front roll stiffness (and also assuming you're happy with a dump truck ride) you will have to come up with some other sway bar combinations. Let's try a few:

	Diameter	Relative Torsional Stiffness
Front	15mm	100%
	19mm	160%
	15mm + 15mm	200%
	22mm	215%
	15mm + 19mm	260%
	15mm + 22mm	315%
	19mm + 22mm	375%

Table 5

	Diameter	Relative Torsional Stiffness
Rear	16mm	100%
	19mm	141%
	22mm	189%
	16mm + 16mm	200%
	16mm + 19mm	241%
	16mm + 22mm	289%
	19mm + 22mm	330%

Table 6

Front Sway Bar Diameter(s)	Rear Sway Bar Diameter(s)						
	16mm	19mm	22mm	16mm + 16mm	16mm + 19mm	16mm + 22mm	19mm + 22mm
15mm	124%	87%	66%	62%	51%	42%	38%
19mm	199%	141%	106%	100%	83%	69%	61%
15mm + 15mm	248%	176%	131%	124%	103%	86%	75%
22mm	266%	189%	141%	134%	110%	92%	80%
15mm + 19mm	322%	228%	170%	161%	134%	111%	97%
15mm + 22mm	393%	276%	206%	194%	162%	135%	118%
19mm + 22mm	465%	330%	246%	232%	193%	161%	141%

Table 7 - Balance

Table 7 is similar to Table 4, except here we've normalized the table to the car's existing sway bars (19 mm front and two 16 mm rear).

In referring to Table 7 remember that this is no longer normalized to the stock 15 mm /16 mm sway bars. That combination has a ratio of 124%, indicating a tendency to understeer compared to the 19 mm/two 16 mm bars on the car. That's one of the reason's the 15 mm/16 mm combination was abandoned, right?

Once again we're looking for a moderate increase in oversteer without decreasing roll stiffness. A quick glance at Table 7 for ratios less than 100% in incorporating a 19 mm or larger front sway bar provides eight possibilities with ratios of 97%, 92%, 86%, 83%, 80%, 75%, 69%, and 61%. One of these selections should provide adequate oversteer and all of them offer unbelievable roll stiffness (refer to Tables 5 and 6).

Table 7 may be re-normalized to any existing sway bar combination to aid in the proper matching of sway bars - but don't forget to check Tables 5 and 6 to get an idea of how uncomfortable the car will be!

Jim Craig

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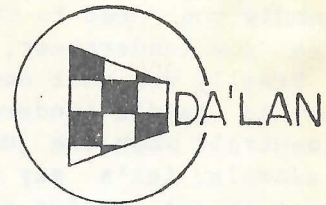
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DEALER INQUIRIES INVITED

TECH TIPS

SQUEEK

2002tii vs 2002 (REVISITED)

Have you ever spent a lot of time and work on a project only to find out later that your information was wrong so the whole project had to be started over again? Welcome to the club! Now, first off, forget the article in the last das Kummet about 2002tii vs 2002 autocrossing. All available data on the tii indicated a 3:45:1 rear end - not until the parts manual was checked were we able to determine that the 2002tii's for export to the USA are fitted with the same rear end and transmission ratios as the 2002: 3.64 and 3.764, 2.02, 1.32, 1.00 respectively. Therefore the tii engine is turning the same RPM for a given road speed as the 2002 engine. I have recalculated the bhp/wt. and torque (mkp)/wt. figures for the two cars in second gear and here are the results for road speeds from 10-40 mph:

RPM	2002		2002 tii	
	bhp/wt	Torque/wt	bhp/wt	Torque/wt
0	0	0	0	0
500	.0028		.0022	
1050	.0096	.0066	.0091	.0062
1750	.0173	.0072	.0173	.0069
2200	.0226	.0074	.0228	.0074
2750	.0294	.0076	.0302	.0077
3400	.0366	.0076	.0384	.0081
3800	.0410	.0075	.0444	.0081
4500	.0453	.0071	.0517	.0082

From this we can see that from 20 mph on up the tii does indeed have a power advantage over the 2002. Frankly I don't know if this is enough to justify classifying the tii in D/S. I think we will simply have to wait and see how autocross times between the 2002 and 2002tii compare over an extended period. Handling of the two cars may have to be the deciding factor. Even though both cars have 15 mm front and 16 mm rear sway bars, almost all of the tii's extra 111 pounds is over the front wheels giving the tii a more distinct low speed under steer than the 2002.

So there you have it. I hereby apologize for the first misinformed article and hope like hell I've got it straight this time!

Rusty Barton


Do you have a clatter whenever your engine idles roughly, and you think it is coming from under your dash? Possibly it is from the dash, but save yourself some toil. Check the bearing to the throttle arm. It is located on the drain well near the heater fan. If it is dry and clatters the drain well amplifies the sound and transmits it to the passenger compartment. Two drops of oil solved the mystery sound. Even if yours isn't noisy try lubricating it.

S J Galovics

KEEP 'EM CLEAN

The life and performance of your BMW's wiper blades can be improved by cleaning them every month or so with rubbing alcohol. The alcohol removes the "dead" material and any film on the blades. This is a very old item which I thought everyone was familiar with. Surprisingly, very few people do know.

Jim Craig



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Jim Craig
488-6843

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