
TASK

Official Newsletter of the Southern Ontario Glider Group Inc.

Volume 16 Issue 6

December 2000



Inside This Issue:

- Greetings from SC
- Square-Cube Law Stuff
- Classic Designs
- Membership List
- Events Calendar
- For Sale

MERRY CHRISTMAS TO ALL OUR READERS

If you recognise the tune, Sing along!.



THE SQUARE-CUBE LAW & SCALING FOR RC SAILPLANES

by Michael Selig, © Copyright 1990 and 1998

This past summer I, unfortunately, found myself at the controls of someone else's large Sagitta XC after having been calibrated for years to fly my 2M Prodigy. The sailplane was high and downwind when I pushed the nose over to penetrate upwind. I had just reached what seemed to be a moderate and safe speed when suddenly the wings folded and the glider tumbled to the ground in pieces - a fuselage and two wings. The problem was that I attempted to fly the large XC at speeds that appeared to be on the order of my small 2M. On another occasion, a friend of mine scaled a 2M Prodigy up to XC size. His initial reaction to the first few flights was that the 2M flew better - it "seemed" to fly faster than the XC. As further examples, a scale model sailplane looks faster than the full scale, a sparrow looks faster than a crow, and a Learjet looks faster than a DC-10.

So that you will not be easily deceived by what you see, it is worth going over why large aircraft appear to fly slower than small aircraft.

If we consider a class of aircraft of similar geometry and construction (for example, balsa and MonoKote or fiberglass and foam), the weight will scale as the cube of a characteristic length. This follows generally from mass being equal to density times volume. Taking the wing span as the characteristic length, we can therefore write:

$$W = b^3 \quad (1)$$

Likewise for the wing area we have

$$S = b^2 \quad (2)$$

These relations form what is often called the "square-cube law," from which a wealth of useful information may be derived. For instance, these equations can be combined to give

$$\frac{W}{S} = b \quad (3)$$

Thus if a model is scaled up to twice its size, the wing loading will be double if the construction materials are similar. This relationship can be used to estimate the weight of new designs based on old ones. It is only necessary to determine the proportionality constant. Also, since

$$L = \frac{1}{2} \rho V^2 S C_L \quad (1)$$

and $L = W$, we have

$$V = \sqrt{\frac{W}{S}} = \sqrt{b} \quad (4)$$

This shows that if we increase the span and keep geometrically similar models with the same type of construction, then the speed at a given lift coefficient will increase with wing loading. It does not yet show why large aircraft look slower than small aircraft.

When an aircraft is flying, the only relative measure of length or size is the aircraft itself. Therefore, we can only base the speed on how long it takes the aircraft to cover some distance relative to its size. We can write that the time it takes for the aircraft to travel the length of one wing span, b , is

$$t = b/V \tag{5}$$

From (4) we can then write

$$t = \sqrt{b} \tag{6}$$

Immediately we see that as the span increases so too does the time it takes to travel a distance of one wing span. Finally, we can compare the "speeds" of a 2M and XC sailplane by forming the ratio

$$\frac{t_1}{t_2} = \sqrt{\frac{b_1}{b_2}} \tag{7}$$

If the wing span of the larger plane (denoted as 1) is twice the smaller (2), then the time it takes the larger plane to travel one wing span is 41% longer than the smaller. Although it is actually flying 41% faster (see equation (4)), it looks 41% slower. That is a big difference.

(Read, and inwardly digest – especially after a huge Christmas Dinner. – Ed.)



Werner's Big Bird.....Relaxing!

**Is there anybody out there? – Who has an article inside just bursting to get out
- We publish for free!**

For Sale: Want Ads: Personals

For SALE:

*This could be your add here!
Lowest Rates in Town*



Latest project – 7/8 Scale Cessna, powered by 850 Speed 400's – great search plane!



The Southern Ontario Glider Group is a chartered club of MAAC

2000 SOGGI Executive

President:	Bud Wallace 1060, Eastmount Avenue Mississauga, Ont. L5E 1Z3	905-274-3177
Vice President:	Werner Klebert 69, Byron Avenue Stoney Creek, Ont. L8J 2T1	905-578-9431
Treasurer:	Derek Hartwell 39, Isaac Brock Drive Stoney Creek, Ont. L8J 2P1	905-578-7991
Secretary:	Cliff English 24, Blackwood Crescent Hamilton, Ont. L8S 3H5	905-522-4561
Editor:	Dick Colley 101, Braeheid Avenue Waterdown, Ont. L0R 2H5	905-689-7761

Deadline for February Issue of Task: January 22nd 2000

2000-2001 Calendar of Events

- Dec 17 Membership Meeting Rockton Library, 2.00pm
- 2001
- Jan 14 Membership Meeting Rockton Library, 2.00pm
- Feb 11 Membership Meeting Rockton Library, 2.00pm
- Mar 11 Membership Meeting Rockton Library, 2.00pm
- Apr 15 Membership Meeting Rockton Library, 2.00pm
- Contest dates to be confirmed
- May 9 One Design CD Zivko Rizoniko/Cliff English
- June 3 Club Day CD Stan Shaw
- June 13 One Design CD Zivko Rizoniko/Cliff English
- June 24 Golden Oldies CD Bud Wallace
- July 11 One Design CD Zivko Rizoniko/Cliff English
- Aug 15 One Design CD Zivko Rizoniko/Cliff English
- Sept 2 Big Bird Bash CD Werner Klebert
- July Bird of Time Postal Contest CD Stan Shaw
- To be held during July
-

TASK**MEMBERSHIP LIST**

Keith	Armstrong	219, Governors Road	DUNDAS	Ont	L9H 3J7	905-627-4011
Peter	Ashton	200, Edwin Street	Kitchener	Ont	N2H 4P2	519-576-6750
Roy	Auwaerter	9, Jamieson Drive	DUNDAS	Ont	L9H 5A1	905-627-8496
Joseph	Baltaza	19, Gaitwin Street	Brantford	Ont	N3P 1A9	519-751-3698
Robert	Batt	612, Blue Forrest Hill	Burlington	Ont	L7L 4H3	905-632-8790
Rob	Campbell	34, Hopkins Court	DUNDAS	Ont	L9H 5M5	905-627-9435
Dick	Colley	101, Braeheid Avenue	WATERDOWN	Ont	L0R 2H5	905-689-7761
Cliff	English	24, Blackwood Crescent	HAMILTON	Ont	L8S 3H5	905-522-4561
Richard	Fahey	827, Shadeland Ave.,	BURLINGTON	Ont	L7T 2M2	905-637-5469
Fred	Freeman	511-120 Strathcona Ave N	HAMILTON	Ont	L8R 3J5	905-525-6509
Albert	Fund	73, Beech Street	CAMBRIDGE	Ont	N3C 1X6	519-658-9495
Arnold	Gardner	202, San Pedro Drive	HAMILTON	Ont	L9C 2E1	905-383-4418
Don	Guthrie	RR4	Belwood	Ont	N0B 1J0	519-843-4537
Bob	Hammett	183, Uplands Drive	KITCHENER	Ont	N2M 4X3	519-576-7636
Derek	Hartwell	39, Isaac Brock Drive	Stoney Creek	Ont	L8J 2P1	905-578-7991
Werner	Hildesheim	4, Foster Crescent	CAMBRIDGE	Ont	N1R 4R1	519-623-2663
Herb	Jenkins	238, Lloyminn Ave.,	ANCASTER	Ont	L9G 1J1	905-648-6123
Werner	Klebert	59, Byron Avenue	STONEY CREEK	Ont	L8J 2T1	905-578-9431
Otakar	Koprnicky	75, Hazelwood Crescent	CAMBRIDGE	Ont	N1R 8A4	519-740-9504
Herb	Lentfer	23, Walsh Court	BRANTFORD	Ont	N3T 5Y1	519-753-2856
Jack	Linghorne	55, Angelsey Boulevard	ISLINGTON	Ont	M9A 3B8	416-233-0230
Ken	Lockwood	29, Cross Creek Blvd.,	Guelph	Ont	N1H 6J2	519-821-9947
Tom	McCann	2206, Towne Blvd.,	OAKVILLE	Ont	L6H 5H4	905-257-2101
Mike	Penney	388, Massey Drive	ANCASTER	Ont	L9G 3J9	905-648-5843
Paul	Penney	388. Massey Drive	ANCASTER	Ont	L9G 3J9	905-648-5843
Bryn	Rennie	22/1255 Upper Gage Avenue	HAMILTON	Ont	L8W 3C7	905-385-3365
Zivko	Rizoniko	479, Fendalton Street	MISSISSAUGA	Ont	L5B 2L8	905-275-0597
Ann	Tekatch	19, Pheasant Place	Hamilton	Ont	L9A 4Y4	905-575-5433
Bob	Thayer	4108, Millcroft Park	BURLINGTON	Ont	L7M 3V9	905-336-3290
Mike	Thomas	61, Alhart Drive	ETOBICOKE	Ont	M9V 2N1	416-748-2833
Walter	Tremmel	56-600 Silvercreek Blvd	MISSISSAUGA	Ont	L5A 2B4	905-270-5959
Juri	Vosu	3291, Candela Drive	MISSISSAUGA	Ont	L5A 2V1	905-279-9549
Bud	Wallace	1060, Eastmount Avenue	MISSISSAUGA	Ont	L5E 1Z3	905-274-3177
Stewart	Watson	26, Juanita Drive	HAMILTON	Ont	L9C 2G3	905-385-8214
Doug	Wilkins	8448, Twenty Road	HAMILTON	Ont	L9B 1H7	905-679-4973
Bill	Woodward	520, Pine Street	Cambridge	Ont	N3H 2S6	519-653-4251

Correction Notice:

NAME:
 ADDRESS:
 CITY/TOWN:
 POSTAL CODE:
 PHONE:
 e-mail:

